WESTERN GAS

February 1926

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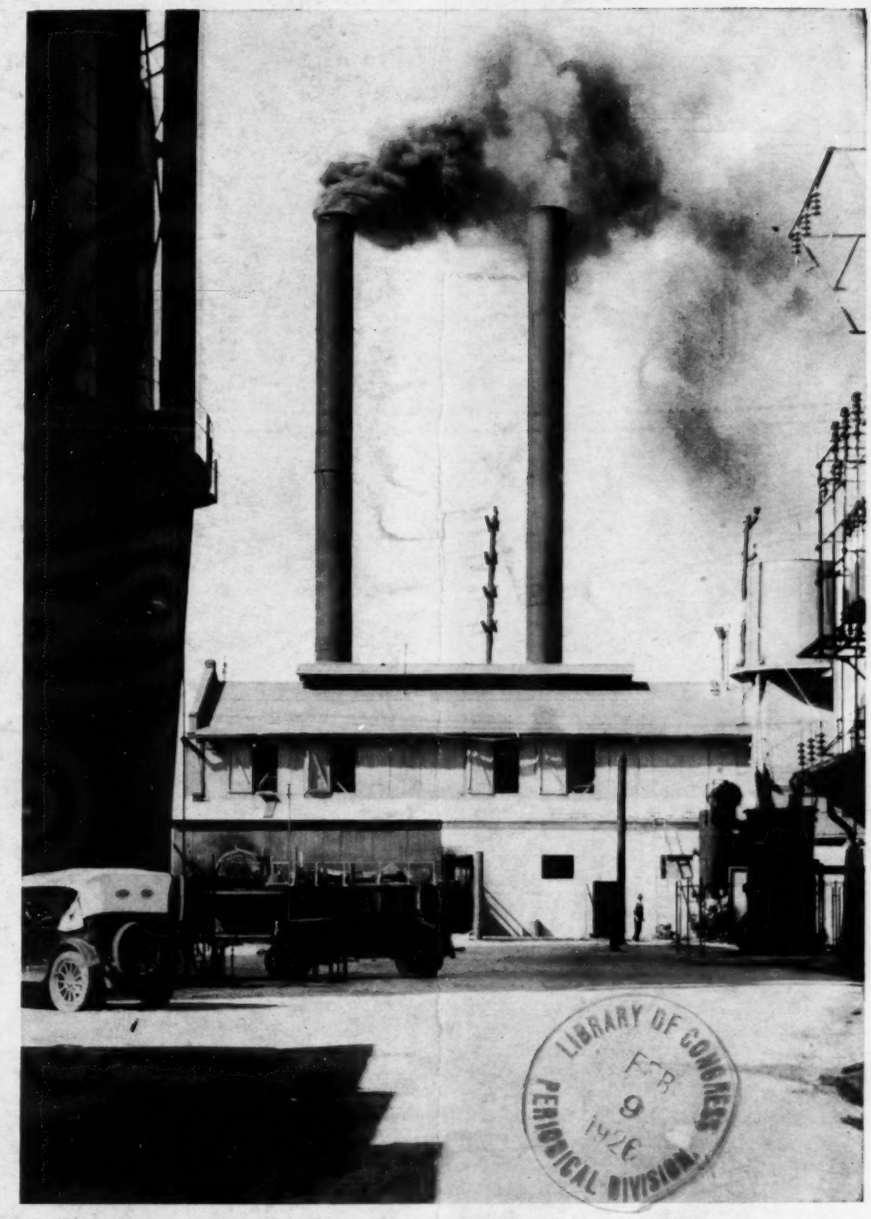

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Official Publication Of The
Pacific Coast Gas Association

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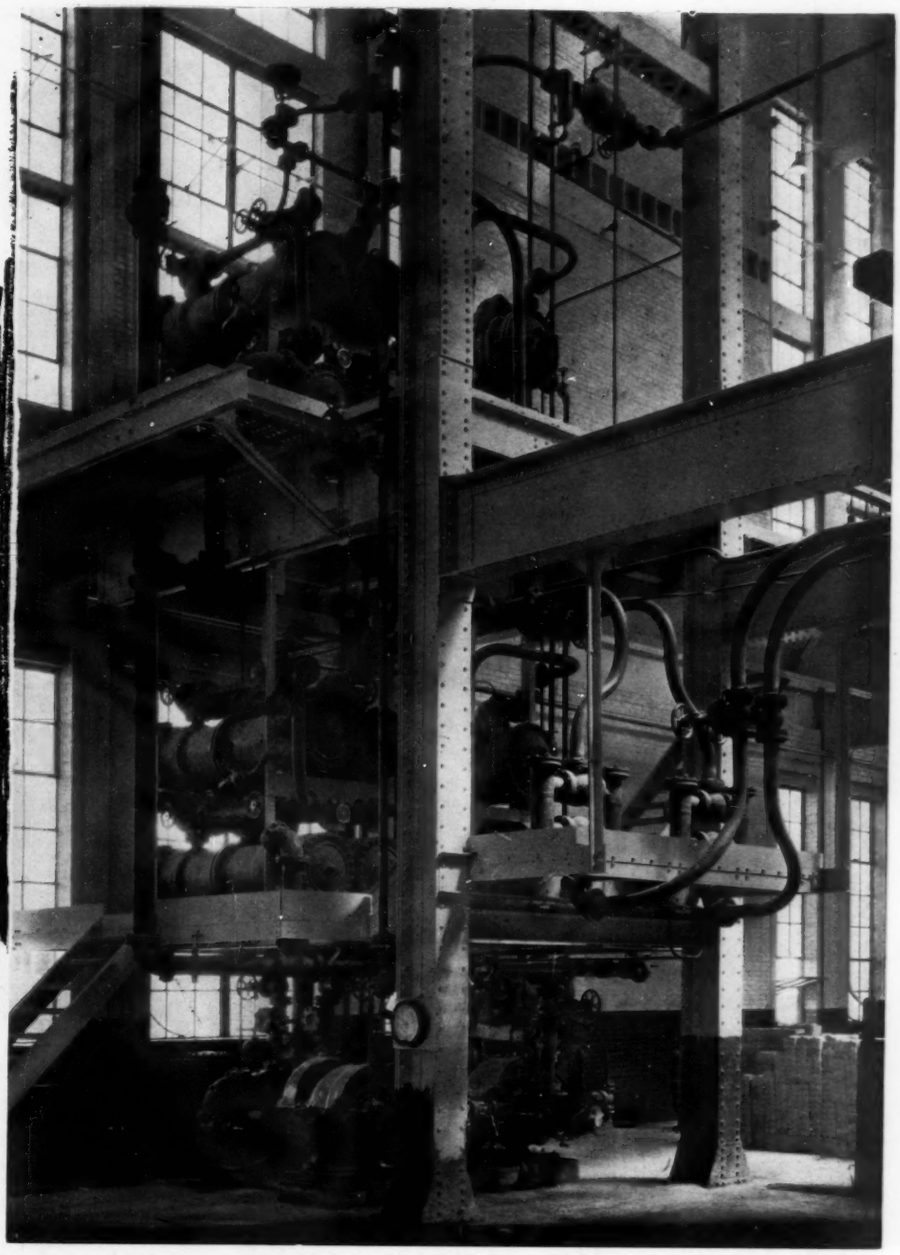

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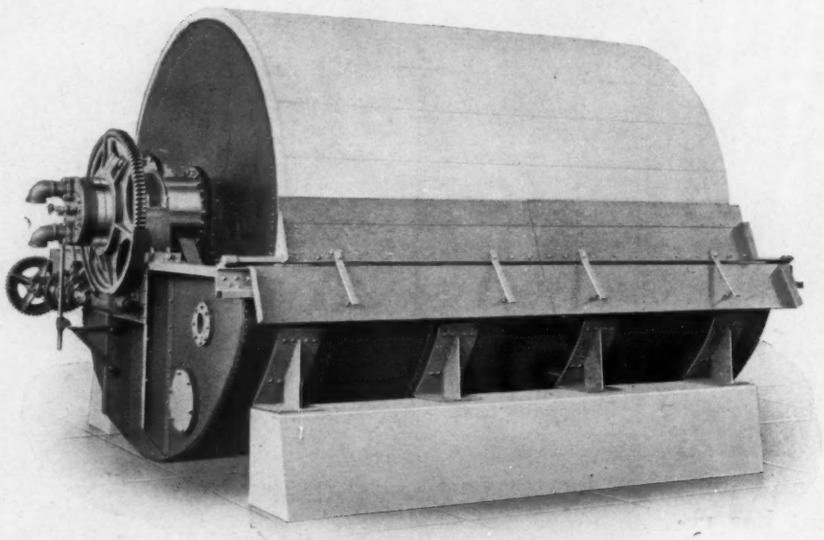

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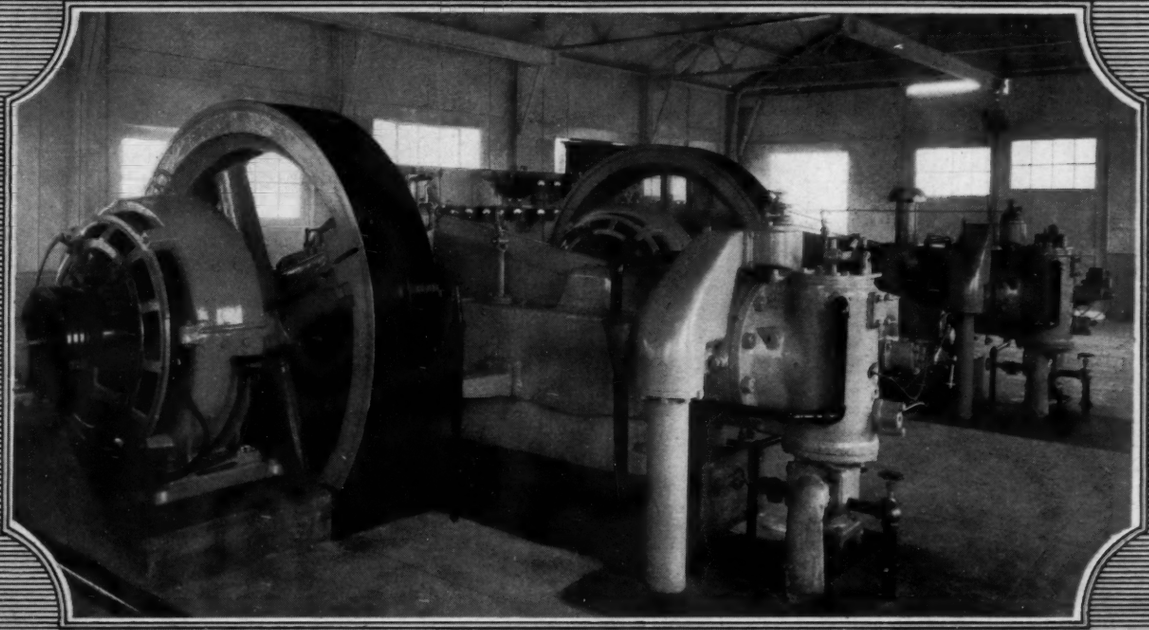

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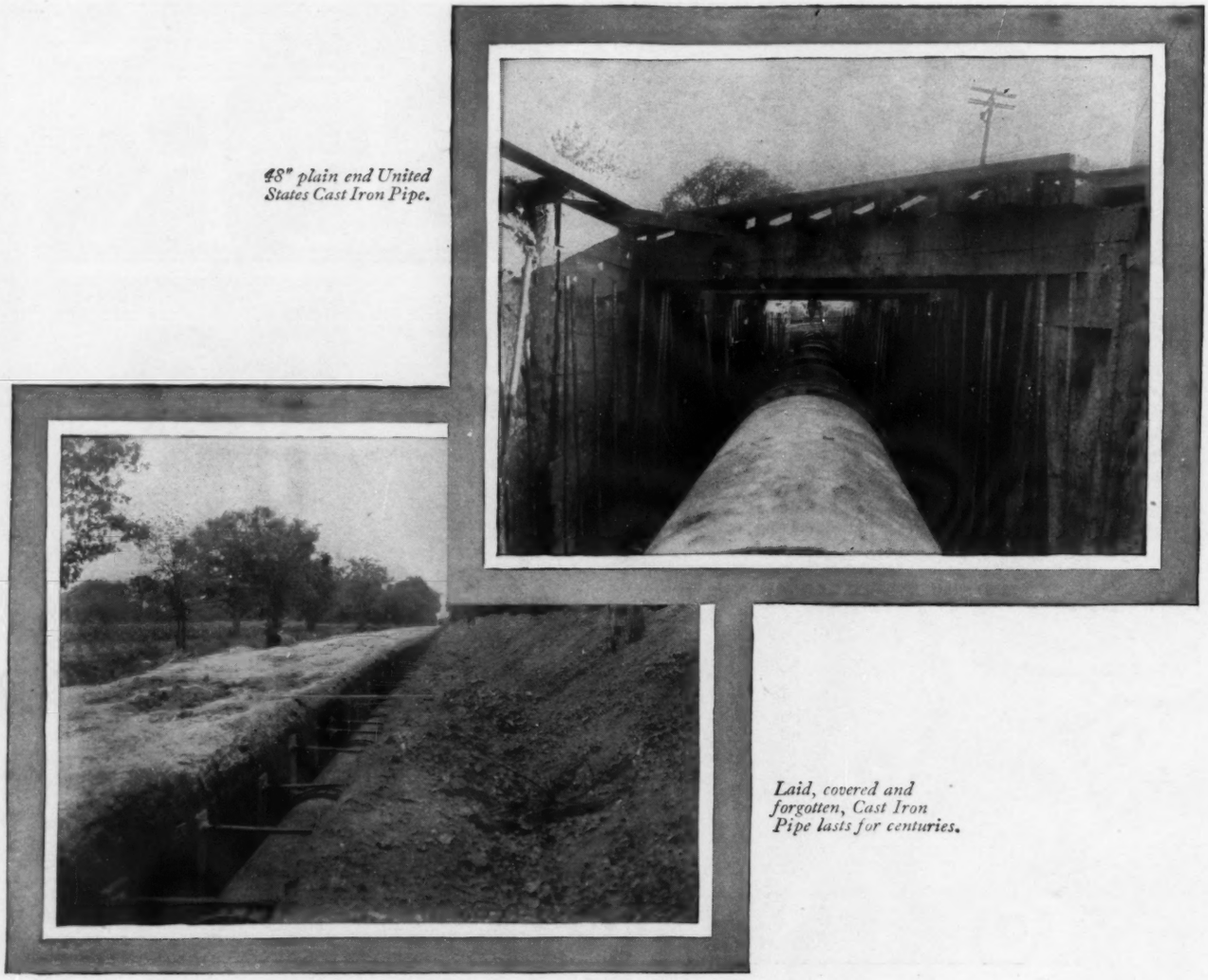

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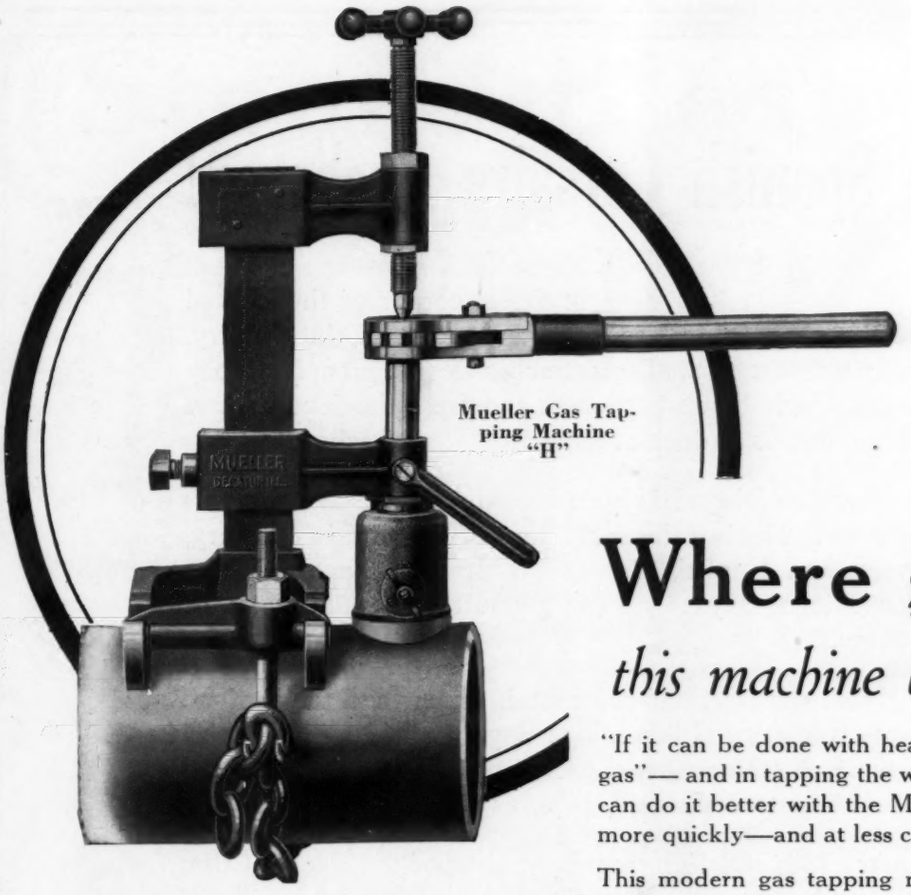

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"If it can be done with heat, it can be done **better** with gas"— and in tapping the way for a wider use of gas, you can do it better with the Mueler Tapping Machine—and more quickly—and at less cost.

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IN ONE corner of the United States, almost the geographical southwestern point of the country, stands a city which fronts on the broad Pacific Ocean. Its placid bay harbors a part of Uncle Sam's battlefleet and from the four corners of the earth come vessels to dock at its well protected wharves.

For 400 years San Diego has been a meeting place for mariners and men of the sea. During the early days of California's history, Spanish Corsairs and English Buccaneers dropped anchor in the waters of San Diego Bay to escape pursuit from the fleets of European monarchs.

These early adventurers and sea captains knew and took refuge behind the protecting arms of San Diego Bay. Cabrillo, Sir Francis Drake and a score of seafaring men wrote history in this port long before our forefathers treked their way across the continental divide.

On February 18th and 19th, representatives of the Pacific Coast Gas Association will participate in a Southern Regional Meeting of that organization in San Diego. This is to be one of several regional gatherings of the present administration of our association.

You are urged to join in the deliberations of this month's gas gathering and rub shoulders with other men of the Pacific Coast. Southern California is expected to send the greatest attendance.

Lock up the desk for two days and head southward toward the romantic harbor of Spanish Corsairs for a pleasant meeting with fellow workers from other western gas companies. Your participation in this event will give encouragement to the Pacific Coast Gas Association and in addition will benefit you in your own life's work.

On to San Diego where Spanish Corsairs Anchored!

Southern Counties Gas Company

Los Angeles, California

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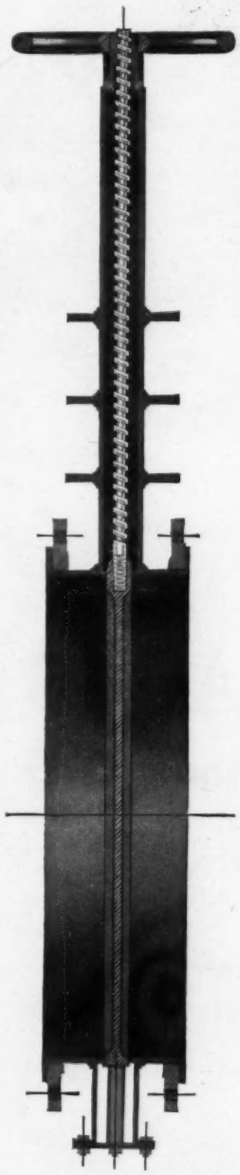

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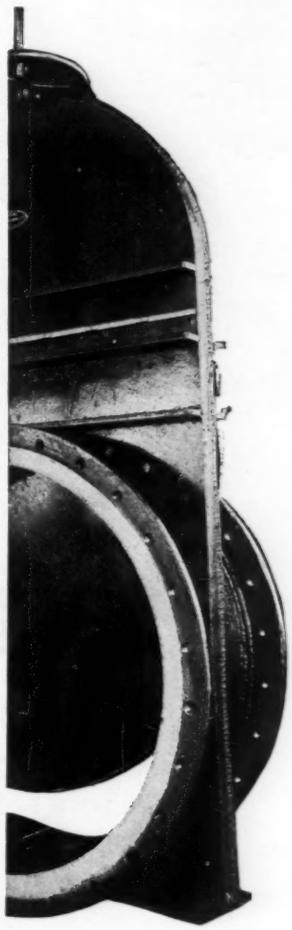

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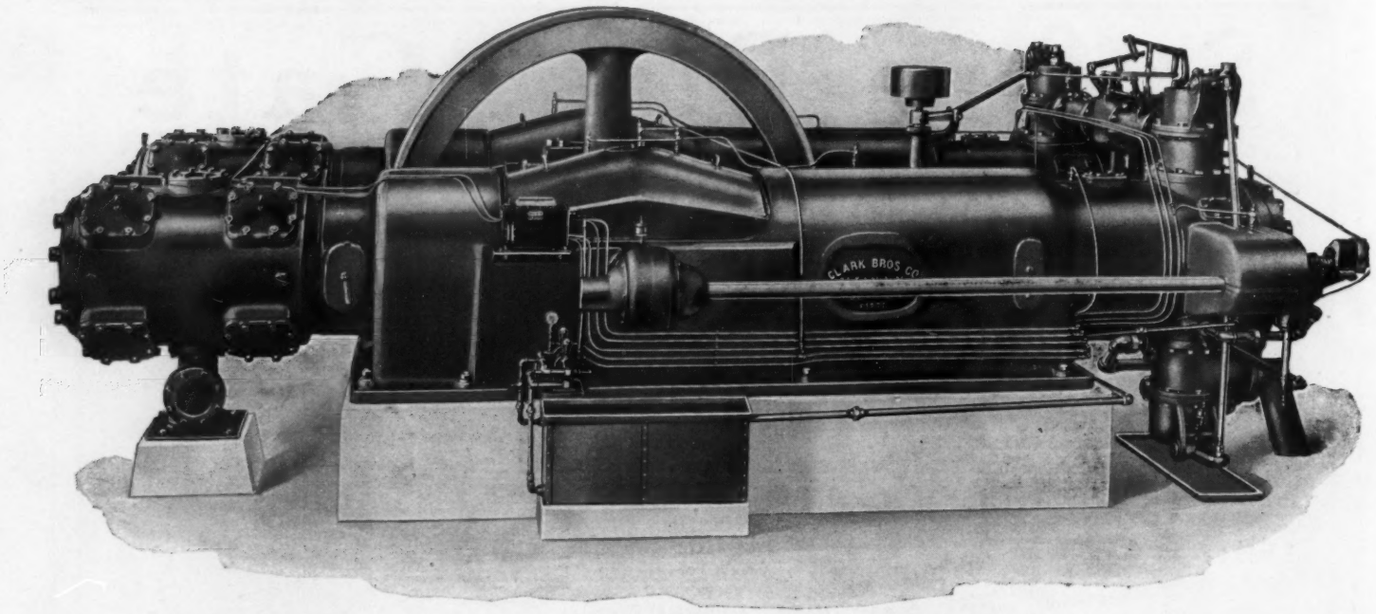

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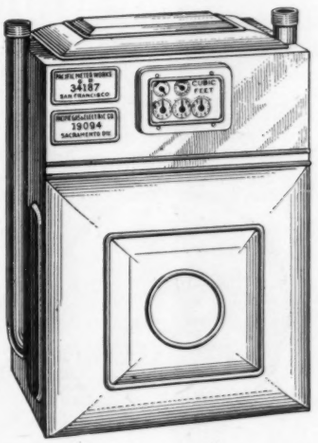

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WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in the *Eleven Western States*

Appliance Students Gather *for* First Lecture *of* Series. Gas Manufacture *Is* Topic

By WALTER M. BERRY

Walter M. Berry

IN the December issue of this journal was announced a course of lectures on gas appliances, to be given by the Gas Appliance Association of southern California, under the auspices of the State University, extension division. This course is now in progress, the first meeting having been held Tuesday, January 12. At this meeting two lectures were delivered, the first by Walter M. Berry, director of the course and executive engineer for the California Gas Research Council, was on gas manufacture; and the second by W. M. Henderson, superintendent of distribution for the Los Angeles Gas and Electric Corporation, was on gas distribution. Mr. Berry has prepared the following comprehensive excerpts from his lecture, and in our March issue a similar treatment of Mr. Henderson's lecture will be published. From month to month the material of the course will be made available through our columns to those of our readers who are interested in benefiting from this education in gas appliances.

THE historical account of the discovery of gas and its early development is treated in a most interesting manner by O. E. Norman in his book, "The Romance of the Gas Industry." From it we learn that the early priests of India and Greece used the light produced from natural gas in their religious rites; and that the Chinese uitilized the gas escaping from beds of soft coal to evaporate the water in their salt works. The gas was also brought in bamboo pipes into Pekin for lighting that city.

The credit for the discovery of coal gas is given to Van Helmont of Brussels who, in 1609, while experimenting in his laboratory, found that a heated crucible containing coal "belched forth a wild spirit of breath." About 50 years later, Thomas Shirley wrote in the Transactions of the Royal Philosophical Society of London about natural gas that arose from a well near Wigan; and in describing the phenomena he said, "The water did burn like oyle." A few years later Dr. Clayton of Crofton duplicated the experiments of Van Helmont and produced a combustible gas from coal; but no practical application was made of these discoveries for a hundred years, and it remained for William Murdock to show that the inflammable substance would burn with great brilliance and might be employed as an economical substitute for lamps and candles. In 1792 Murdock lighted his house with gas, and in 1802 he gave a public exhibition of gas lighting at Soho to celebrate the Peace of Amiens.

The first English patent for gas making was secured in 1804 by a German named Winsor who had followed the investigations of Lebon, a Frenchman, who had secured patents in France a few years before. In spite of ridicule and strong opposition he managed to raise a considerable sum of money for starting a gas company, and in 1812 was granted a Royal Charter for the first gas company in the world.

Westminster Bridge was lighted by gas for the first time on December 31, 1813. The populace was dumbfounded, and lamplighters refused to have anything to do at first with the new light. The next year the House of Commons was gas lighted, but the people were still suspicious; piping was kept away from the walls, and no one dared to touch the pipes with the bare hand.

Growth of the Gas Industry

The first gas company founded in the United States was the Gas Light company of Baltimore, incorporated in 1817 by Rembrandt Peale and his associates. Previously to this, Peale had exhibited an installation of gas lights in his museum, and an admission fee was charged for the privilege of seeing the lights.

Strong opposition and prejudice developed in many of our cities. Philadelphia drew up "A Public Remonstrance against Lighting with Gas"; and in Connecticut the following cogent reasons were advanced against the introduction of gas for lighting:

1. Artificial illumination is an attempt to interfere with the divine plan of the world, which had preordained that it should be dark during the night.
2. Emanations of illuminating gas are injurious. Lighted streets will incline people to remain out of doors, thus leading to increase of ailments through colds.
3. The fear of darkness will vanish, and drunkenness and depravity increase.
4. Horses will be frightened and thieves emboldened.
5. If streets are illuminated every night such constant illumination will rob festive occasions of their charm.

Notwithstanding the reluctance of many persons to accept the new innovation in lighting, and in spite of the fact that gas sold at rates from three to 10 times as much per thousand as it does at the present time, they were compelled to adopt gas because of its great advantage over candles and other forms of illumination. In 1860 there were

(Continued on Page 26)

Gas Utilities *of the* West Show Substantial Growth *in* 1925

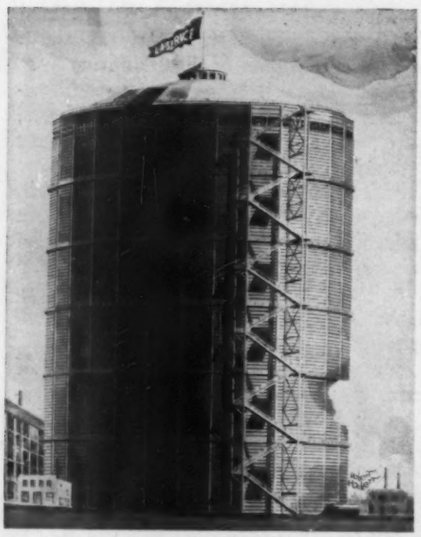
Budgets for Present Year Call for Numerous Betterments in Western Expansion Program

This view of San Diego Consolidated Gas and Electric Company holders shows graphically the increase in gas consumption in San Diego

ANOTHER year in the annals of gas service in the West has wound to a close, and those whose interests are linked with the gas industry are wondering what the net result of their effort has been. Has it been a year of advance or has the industry halted in the forward movement which has marked it during the past several years?

Perhaps the present article can shed some light on this question. Some time ago *Western Gas* issued a questionnaire on 1925 developments in the gas industry of the West, and on plans for 1926 expansion. This questionnaire went to every gas utility, large and small, in the 11 western states, the western Canadian provinces, and other sections, and the returns have been such as to give a cross-section of the industry. Information on nearly 50 companies was received through this questionnaire and these companies are widely scattered as to location and range in size from the company reporting a gain of one customer in 1925 to that boasting more than 20,000 new meters installed.

To say that every one of the 50 companies reported an increase in operations in 1925 over 1924 would exceed the truth, for a few of the returns showed decreases. In the main, however, the report was one of increase. Not all of the companies gave the desired information on 1925 expenditures, but to the question regarding increase of expenditures in 1925 over amounts spent the year previous 29 companies replied; of this 29, 21 showed increases and nine showed less money expended than in 1924. By totalling the 21 expenditures showing increases and subtracting the total of those showing decreases it was seen that a gain of $1,612,945 for 1925 expenditures over those of 1924 remained as a net increase for betterment and maintenance in these 29 utilities. The 37 companies giving amounts spent for maintenance and betterments in 1925 reported a total of $22,144,770.



Artist's Drawing of Los Angeles Gas and Electric Corporation's new 15,000,000 cu. ft. waterless gas holder

Not only was more expenditure thus indicated for 1925 betterment than in the year preceding, but there was a tremendous gain in consumers. Of the companies affording *Western Gas* information 35 reported increases in number of meters, the total gain being 94,649. In judging these figures it must of course be kept in mind that returns to this questionnaire were by no means comprehensive, though they included the larger companies and a representative showing of the smaller. The substance of the questionnaire findings is offered as indicating a general growth, and any totals mentioned of course relate only to the companies returning the requested data.

10.9% Gain in 1925 Sendout

Thirty-two companies gave the desired information on per cent of increase in amount of gas sold in the first nine months of 1925 over 1924. The percentages ranged from 33 1-3 % down to 1%, and the average for the 32 was a 10.9 percentage increase. This would seem to demonstrate that the West has claimed its proportional share of the nation-wide increase in gas output of the past year. This national increase has been authoritatively estimated at 16 billion cubic feet for manufactured gas alone.

Judged from the standpoint of money expended for maintenance and betterment, of new customers added to lines, and of increase in gas send out the industry of the West is seen to have made a tremendous contribution to general prosperity in the year just closed. Plans which are held for the immediate future by western gas utilities call for additional expansion to meet and anticipate the growing needs of western communities. Not all companies had formulated budgets for 1926 when the *Western Gas* questionnaires were filled out, but 24 furnished the amounts which are to be put into maintenance and development of gas systems in the present year. The budgets of these 24 bring a total of nearly 15 million dollars, the exact total of their estimated budgets being $14,758,625.

In the pages following the individual questionnaires received by *Western Gas* are reveiwed, with a separate section devoted to the 1925 projects and 1926 plans of each company furnishing the needed information. This material, full of typical gas service expansion projects, will demonstrate more clearly than can unrelated totals, the continual growth that is transpiring in western utilities. Many of the examples given will in themselves appear insignificant, but for every such example offered there are many similar ones, and the returns here presented must be taken as representative.

For convenience the returns from the various companies will be reviewed in the alphabetical order of the towns and states in which the companies are located.

Bisbee, Arizona

The Bisbee Improvement Company reports a 15% increase in gas output

for the first nine months of 1925 over the same period in 1924. It was anticipated that a loss to June 30 of 118 meters, from the 1924 total, would be made up in winter heating installations.

Nogales, Arizona

A 21% increase in gas sales is reported for the Southern Arizona Power Company. The sum of $25,000 went into improvements and maintenance during 1925 and a like sum has been appropriated for 1926 expenditure.

Prescott, Arizona

The Arizona Power Company increased its gas output by six per cent.

Tuscon, Arizona

During 1926 an estimated $160,000 will go into the Tuscon Gas, Electric Light and Power Company's gas system, to cover the cost of a 500,000 cu. ft. holder, a 16-inch grasshopper connection to a relief holder, and other items of betterment and maintenance. The 21% increase in gas sold by this utility is partly explained by a gain of 962 consumers. Expenditures for mains, meters and services last year amounted to $75,100 out of a gross expenditure for maintenance and betterment of $120,-457. Land purchased called for $35,200.

Winslow, Arizona

In the latter part of January, 1926, Winslow's new municipal gas plant went into service. About $55,000 was put into the construction of the plant last year, and the equipment covered by this sum included the following: a 50,000 cu. ft. gas holder ($17,000); new fireproof building constructed of Gallup brick, and grounds ($7000); 10,000 cu. ft. hourly capacity down draft straight shot oil gas generator, scrubbers, purifier box ($13,000); other equipment and repairs totaling $8,000. The city of Winslow passed a $50,000 bond issue to provide for the above plant, and the citizens expect to begin reaping the benefits of improved gas service immediately. For standby service the old plant is to be reconditioned.

Fresno, California

Increase in gas sold at Fresno of 10.14% is reported by the San Joaquin Light and Power Corporation, with $7,000 more spent for maintenance and betterment in 1925 than in 1924. The total expended under these heads was $250,000. For 1926 expansion $255,-000 has been set aside.

Huntington Beach, Calif.

For its municipal gas department the City of Huntington Beach reports a gain of 7% in gas sold, 150 new meters, and $51,854 expended last year for maintenance and betterments.

Imperial Valley, California

Inland Empire Gas Company has been newly organized to bring gas service to Imperial Valley. *Imperial, Brawley, Calexico,* and *El Centro* are among the communities to be served.

Los Angeles, California

The Los Angeles Gas and Electric Corporation spent $5,300,000 for betterments in 1925, a considerable sum, although it is some $2,366,000 under that of 1924. Under the head of maintenance the Corporation expended $459,062, an increase of $56,762 over 1924. New meters to the number of 20,209 were installed, 169 miles of distribution mains laid, and gas send out increased 15.74% in the nine month period covered under this item of the questionnaire. The major construction item was the 15,000,000 cu. ft. waterless gas holder erected at Ducommon street at a cost of $833,500. Other items were: a 1,000,000 cu. ft. steam driven gas compressor ($201,-000); a 1,000,000 cu. ft. electric driven gas compressor ($55,000); 890 H.P. boilers ($111,900); 45′x185′ brick-compressor building addition ($57,-000), all these betterments having been installed at the Ducommon Street gas works.

An estimated $2,700,000 will be expended in 1926 by the Los Angeles Gas and Electric Corporation for gas department betterments, allotted almost entirely to the distribution system. The budget for the distribution system calls for 100 miles of commercial gas mains, 32 miles of pressure mains, 21,500 gas services, 20,000 gas meters, and the possibility of 25 additional miles of commercial mains, with services and meters to correspond. Minor additions to production equipment are contemplated. The maintenance budget for 1926 is approximately $500,000.

So. Calif. Gas Company

Information relative to the Southern California is incomplete, but during the first 10 months of 1925 there were 15,-975 customers' meters gained, 200 miles of gas mains being laid and 36,935,382,-000 cu. ft. of gas handled in the same period. The Midway Gas Company handled 53,117,148,000 cu. ft. of gas in these 10 months. News reports published in December, 1925, credited the Southern California Gas Company and Midway Gas Company combined with spending approximately $4,000,000 during 1925, but definite totals are not now available.

Southern Counties Gas Co.

A gross expenditure of $3,550,000 during 1925 is the record of the Southern Counties Gas Company, which serves 62 communities outside of Los Angeles in Southern California. This figure represented an increase of $1,790,-

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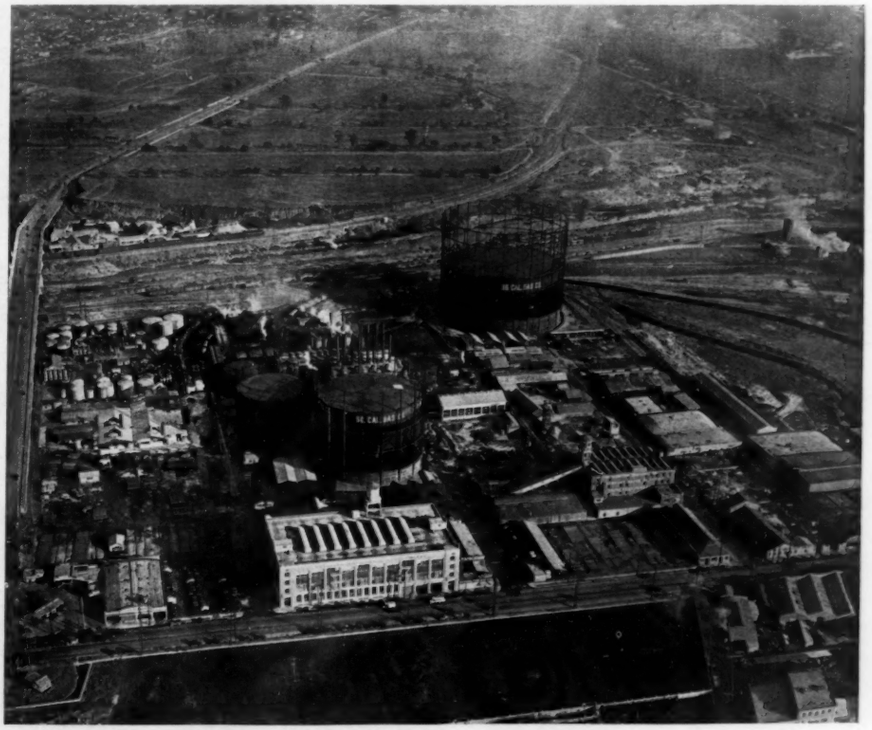


Aerial view of Southern California Gas Company's Los Angeles plant

A Survey *of* Natural Gas Developments *in the* Northwest Extension *at* Signal Hill

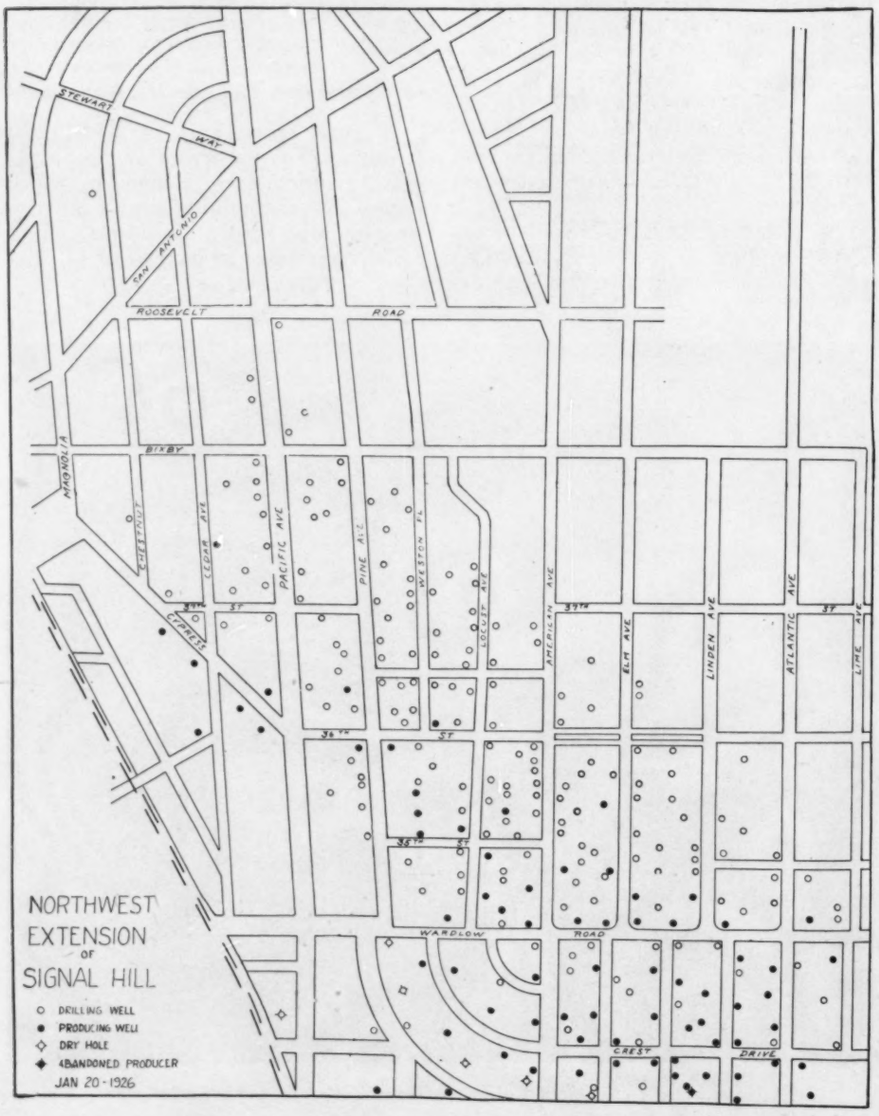
Peak Production May Amount to as Much as Forty Million Feet a Day; Gasoline Extraction Yields 0.6 to 1.0 Gal. per 1000 cu. ft.

By J. A. CAMPBELL
Natural Gas Engineer.

ALTHOUGH it is too early to make anything even approaching an accurate analysis of the potentialities as a gas producing area of the new "Northwest Extension" at Long Beach, it is felt that a survey of conditions as they have developed up to the present may be of interest to those concerned with the natural gas and gasoline business. Accordingly, the writer has gathered together data from several of the casinghead gasoline plants operating in this area, and presents a summary of these data, together with an estimate of the probable time and amount of the peak of gas production.

The Northwest Extension is the worst example of extreme close drilling yet witnessed in the Los Angeles basin. As has happened in the case of four of the other major local fields, the surface of the ground was subdivided into residential lots before the presence of oil underneath was suspected. At the beginning some attempts were made to work out community lease arrangements in the Extension, but now every single lot owner seems to be determined to have an oil well on his particular lot. In a total area of roughly 135 acres there are now 253 drilling and producing wells, and new ones are going up at the rate of about three a day. The closest-drilled block in the field so far is the block between 35th and 36th streets on the west side of American Ave. In this block there are 16 wells, with a total drainage area of about 6 acres. Conservative drilling would require only one, or at most two, wells in this area, the producing zone being only about 60 feet thick.

The performance of the wells brought in so far shows the effect of this extremely congested drilling. The typical well flows for two or three weeks after completion, then suddenly quits and has to be pumped thereafter. Several of the later wells in the more congested district have been pumpers from the start.



Extent of Field Estimated

In order to arrive at an estimate of the probable gas production of the field it is necessary to assume some definite limit to the development; and at the present time this assumption can be nothing more than a guess based on a rough examination of the present development and the topography of the adjacent areas which have not yet been tested. For the purpose of this article, the Northwest Extension field is considered to include the area shown on the map (Fig. 1), although the northern limit is of course undetermined as yet. After making a rough general survey of this area, it is the writer's opinion that the ultimate development of the field will cover an area about twice as large as that of the present area of congested drilling. Since the present number of producing and drilling wells is about 250, there will probably be about 500 wells when the field is completely drilled up, if the present close drilling is continued. This seems likely, since "town lot" subdivisions cover the entire area of what appears to be the structure.

In attempting to arrive at a decline curve by calculating the average gas production per well from plant data, it was found that the decline of the individual wells was completely masked, because the new wells toward the northwestern limits of development showed a larger flush production than the older wells toward the south had shown, and hence the addition of a few new wells made up for the decline of the larger number of older wells. For instance, one plant with 19 wells connected on Nov. 1, 1925,

showed an average production of 384,000 feet per well per day, and with 37 wells connected on Jan. 12, 1926, showed 379,000 feet per well, or practically no decline in the average. It is uncertain whether this tendency toward larger flush production will continue as the field is developed to the northwest. Six of the latest wells have shown flush production between two and one-half and three million feet each, whereas the older wells near the south limit of the area flushed about one-half to one million each. The writer believes that the larger flush production of the newer wells is due to their greater distance from old production, and that when a few more of the wells now drilling are brought in the flush will drop down to about the figure established in the southern part.

Basis of Decline Curve

In order to get around this difficulty, a group of seven wells having fairly typical histories was selected, and their average gas production was plotted against their ages. The curve so obtained is shown in Fig. 2. These wells were selected so as to be properly distributed over the present developed limit of the field, and do not include any of the extremely large new wells nor any of the very small old wells. Their performance checks well with the average of the whole field to date. The decline curve from these wells indicats an average flush of about 835,000 feet per day, declining to 450,000 at the end of one month, about 300,000 after two months, and about 225,000 after three months. At this age the curve is flattening out decidedly, and indicates that the production will probably lie between 100,000 and 150,000 feet per well at the end of a year.

At the time of writing this article, Jan. 20, 1926, there are 75 producing and 178 drilling wells in the Northwest Extension. During the six days preceding this date six new wells were completed and 15 new rigs were put up. The gross wet gas production at this time is about 27 million feet, or an average per well of 364,000 feet per day. On account of the large number of drilling wells, the field is actually using more gas than it is producing. As nearly as can be determined from available data, this deficit amounts to about four million feet per day. This condition will undoubtedly continue for at least a few more weeks, since the number of new wells started per week is about two and one-half times the number of completions.

If the assumptions made above regarding the ultimate size of the field are reasonably accurate, the above data indicate that the peak of net dry gas production from the field will be reached about the middle of the summer, and may amount to as much as forty million feet per day. It must be appreciated that this estimate is based on assumptions which are absolutely impossible to verify at the present time. If the O'Donnell outpost well (the most northerly well on the map) proves to be a producer, it will give a tremendous impetus to frenzied drilling over a large area to the northwest of present development, with results that are impossible to predict. Also, judging by surface contours only, it is possible that the field may spread out to the east in the vicinity of Bixby Road, and this would of course radically affect the future of the field. If the O'Donnell well should prove to be a "duster", it would certainly tend to check the present rapid expansion, and the above estimate of peak production would undoubtedly be too high.

There are at present five companies operating six absorption plants in the Northwest Extension. The total normal gas capacity of these plants is about 40 million feet per day; hence they should be able to handle the peak of gross production without serious overloading. All of the plants are equipped with compressors, since it is impracticable to operate on natural pressure on account of the rapid decline of the permissible trap pressures. The average pressure on the traps is now about 10 lbs. per sq. in. gauge.

The present plants are all of the straight oil absorption type, with absorbers operating at 25 to 30 lbs. per sq. in. gauge pressure. Three of the plants are equipped with Campbell "Oil Froth" absorbers, one with Southwestern Engineering Co.'s bubble towers, one with Newton absorbers, and one with an unpatented design of bubble towers. Clark direct connected compressors are used in five of the plants, the sixth being equipped with Coopers.

The extraction realized in the plants treating the gas from the Northwest Extension varies from 0.6 to 1.0 gallon per

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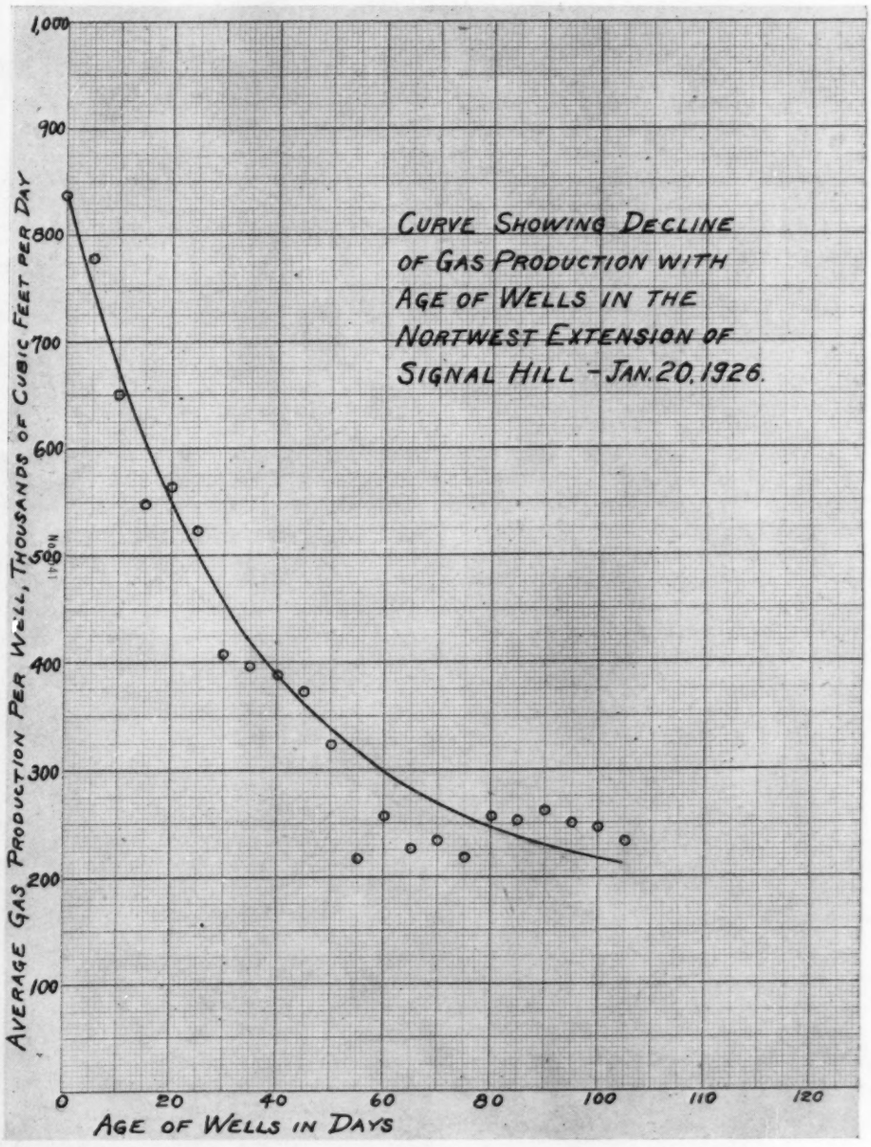


Economy *in* Fuel Costs Follows Use *of* Natural Gas *in* Biltmore Hotel Installation

Chief Engineer Tells of Advantages of Gas Service as Seen in Hotel Experience with Gas and Oil; 18% Saving Effected

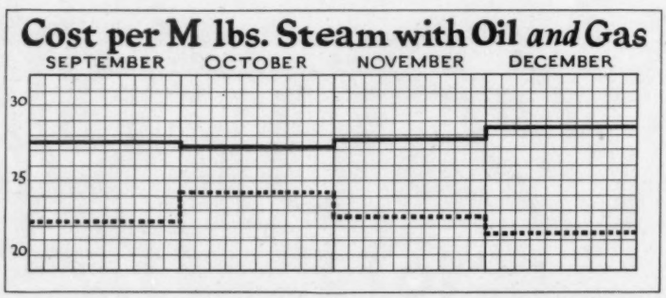
By L. M. GLODELL,
Chief Engineer, Los Angeles Biltmore

IN the selection of a fuel for steam generation the first consideration in the minds of those paying the bills is its cost, where more than one class of fuel is available. Here in Los Angeles it comes down to two—oil and gas.

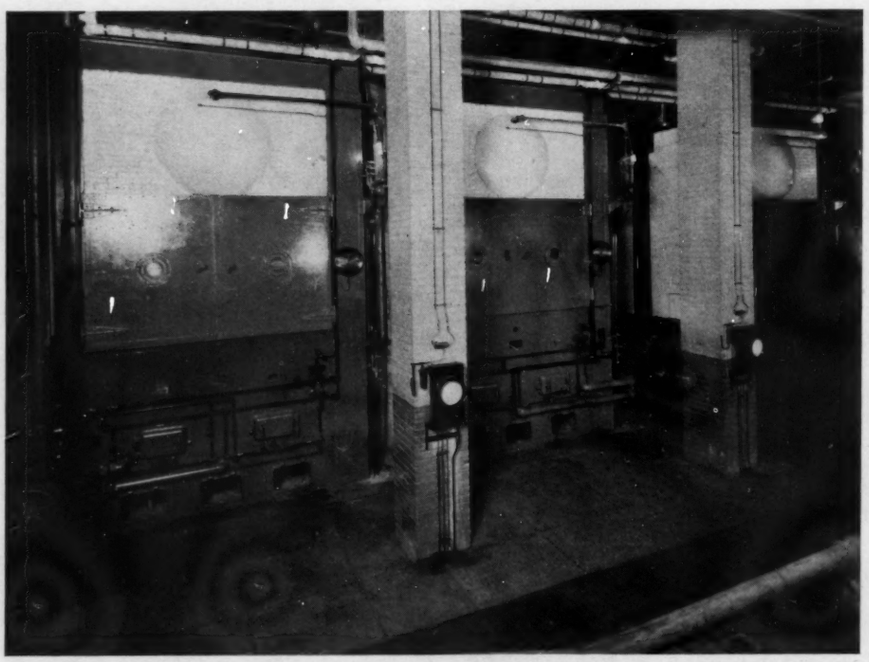
For a plant and hotel located as is the Biltmore, gas has many points in its favor over oil. For instance, oil tank trucks can deliver oil in this section of the city only between the hours 6 p.m. and 7 a.m., except Sundays and holidays. In receiving a tank of oil the oil is checked for temperature and gravity and the number of gallons. Where as many as 10 tank truck loads have been received between 6 p.m. and midnight nearly all of one man's time has been occupied. Then there is also the annoyance and delay in parking and making connection to receiving tanks, which is augmented when some pleasure car is left parked along side the oil valve at the curb.

There is also the inevitable dirt from handling oil to be considered. Pumps must be operated for burners, steam being used for pumps and oil atomization, all of which, together with their maintenance, must be included in cost of operation. At times, with oil as fuel, there is smoke even with best of attendance, either due to sudden load or some minor happening. Aside from the inefficiency of smoking stacks and the nuisance caused to ourselves and surrounding buildings, there is the other phase of annoyance to guests in their rooms and the more or less dirt and smudge which will settle on expensive draperies and hangings.

In the Biltmore plant there are three boilers of 3478 sq. ft. of heating surface, of the Llewellyn Heine type, and they operate at 160 lbs. steam pressure. They are equipped for gas with Leintz burners which have been changed by us for our conditions. These boilers are arranged to burn oil in emergency, being outfitted with separate oil burners.



In the above graph the solid line shows costs per thousand pounds of steam generated with oil during four months of 1924. The broken line shows costs with gas during the same months of 1925. The vertical graduation reads in cents



These three 350 H.P. boilers installed at the Los Angeles Biltmore burn natural gas.

There are three load periods, one being that from midnight to 6 a.m., when there is used only steam for kitchen and valet, hot water for house service and steam for heating during cool months. One boiler handles this load easily. From 6 a.m. until 4 p.m. the above load continues, with more steam used for each service and with the laundry added. This period runs a boiler load of from full rating—350 boiler H. P.—to 150 per cent rating. From 4 p.m. until 9:30 and sometimes until midnight the entire electrical load is carried by a 1000 K. W. Curtis turbine driving a 500 K.V.A. 220 volt three-phase and 500 K. W. 110-220 D. C. three wire generator. At this time two boilers only are used and operate at from 150 per cent to 170 per cent of rating.

We find that gas is much more flexible and easier to handle, and carries our load more easily and with better regulation and constant steam pressure than was the case with oil fuel. Also we find that the refractory furnace lining deteriorates less with gas than oil, and the outsides of the tubes are cleaner. Thus far the gas supply has been constant, although there was some minor trouble when starting its use. Each boiler is equipped with a Republic C O_2 recorder and all the steam generated is metered by a Republic steam flowmeter of recording and integrating type. These instruments are a valuable aid in operating and in ascertaining the steam costs.

(Continued Page 40)

High Quality Gas *from* Cheap Oils---Bean Process Gives New Application *to* Old Principles

By Col. E. E. Garrison

President Gas Bond and Share Corporation of America

ONE of the greatest advances made in the gas industry since Dr. Lowe, fifty years ago, evolved a process for carbureting water gas, is the invention and development by Orestes U. Bean of a process for manufacturing superior gas from cheap, heavy oils, still-bottoms, residuums and tars.

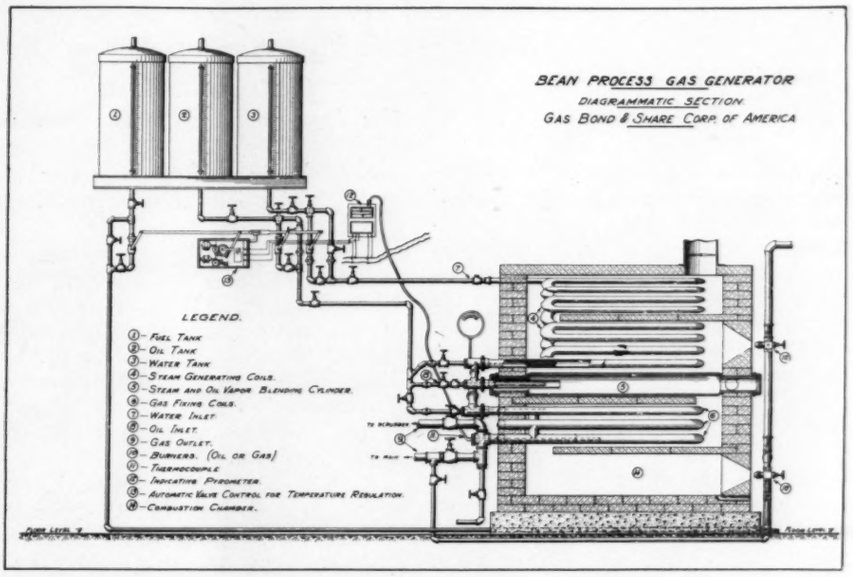
Although several of the theories the inventor has put into practice seem revolutionary as compared with present practice, there is as a matter of fact nothing new in the Bean process. On the contrary the process involves nothing more than the practical application, in a new way, of certain well-known principles of chemistry and engineering to produce a high B. t. u. gas at comparatively low cost.

For example, it has long been the practice in the manufacture of gas to break up the raw material at high temperatures, a practice which not only entails a tremendous loss of heat energy and a consequent waste of fuel, but which reduces the efficiency of the finished product in that CO and CO_2 take the place of the illuminants which form at lower temperatures.

Mr. Bean discovered that his hydrocarbon raw material could be cracked and vaporized in a column of steam at temperatures around 780 degrees F., and that it was never necessary to go beyond the known temperatures of gas fixity (1180 to 1250) to secure a desirable recombination of high B. t. u. hydrocarbons. As a result of holding temperatures below the combustion point, Bean process gas contains negligible quantities of CO and CO_2, and a consequent high percentage of methane and illuminants.

At the time this article is being written a complete demonstration plant, commercial size, has just been blown in at Long Island City, New York, where the Bean process will be given duty tests over long periods of time to demonstrate its superiority over other gas manufacturing processes, both from the standpoints of economy and efficiency of production.

On the basis of tests that have been conducted during the last three years in the plant of the Long Island Lighting Company at West Babylon, Long Island, the new plant, which is better equipped and which embraces a number of improvements, will demonstrate the following facts of interest to the gas world:



Sectional Elevation, Bean Process Generator. Dimensions, twin unit, 6'x6'x7'. Supply tanks and automatic controls are shown in illustration

Claims for New Process

The production of 1200 to 1400 B. t. u. gas made from 15 Baume refinery stillbottoms residuum.

The production of 10,000 cubic feet of such gas per hour in a twin unit generator occupying 6′ x 6′ floor space (Maximum capacity 12,000 cubic feet per hour.)

The utilization of 7 gallons of raw material, costing 3 cents or less per gallon, together with its complement of water for the production of 1000 cubic feet of such gas.

The utilization of one gallon of fuel oil as sufficient to get up temperatures, after which heats are maintained from the gas generated. (Forty-five minutes are required to heat the furnaces.)

The extraction, by compression, of 1½ to 2 gallons of rare quality gasoline from every 1000 cubic feet of gas manufactured, leaving a dry gas of approximately 1000 B. t. u. per cubic feet, suitable for storage or piping under high pressures.

The entire operation under automatic temperature and pressure control, reducing the use of skilled labor to a minimum.

The absence of carbon monoxide in any appreciable quantity, rendering the gas non-poisonous.

The presence, when desired, of 12 to 15 per cent free oxygen in the unstripped gas, giving an oxy-hydrocarbon gas highly suitable for immediate industrial use. (The free oxygen is present when the scrubber is by-passed, and disappears when the gas is run through the scrubber).

The new plant provides a convenient and complete unit combining all of the latest features and improvements, together with a test laboratory for the further study of the by-product. The entire plant, including generators, scrubbers, condenser, purifying equipment, pressure holders, compressors, and demonstration units, occupies a new building, 50′ x 100′. Among the demonstration units being installed are instantaneous heater, cook range, electricity generating equipment, forges and annealing oven, and a variety of illuminating devices.

Description of Process

In the following description of the Bean process no attempt is made to discuss the theory of chemical reactions, but the chemical engineer or the trained physicist will see that, while certain established practices in gas manufacture seem to have been abandoned, no fundamental scientific principle has been violated; rather does the Bean process confirm theories for which proofs have long been sought.

The Bean process plant may be described as a carbureted-water-gas-plant-in-conduit. The gas is generated in a continuous tube or conduit so designed

(Continued on Page 31)

Specifications Forms *and* Code *for* Installation Procedure Raise Furnace Standards

Oakland and San Francisco Dealers in Co-operative Step to Remove Evil of Inferior Installation; Read Their Code

By PAUL M. HARLAN
Gas Appliance Society of San Francisco

SEVERAL months ago in the Bay district, the proper installation of gas-fired warm air furnaces had unfortunately become a merchandising as well as a technical problem. An excessively competitive market had forced the price level below a profitable figure and the gas furnace dealer was compelled to do business on a meagre return or was pushed to the doubtful alternative of skimping materials and workmanship in order to show a profit. Of course the conscientious heating dealers made every effort to stem the tide, but this condition, coupled with the lowered construction standards of a speculative building boom, was gradually leading to poorer and poorer installations at cheaper and still cheaper prices.

As usual, the public was the ultimate sufferer. Little or no insulation, small warm air pipes, inadequate furnace capacities, and careless roughing-in meant high gas bills and general dissatisfaction. The mark of excellence which gas heat had earned for itself was forgotten on many a chilly morning where such conditions prevailed.

Realizing their obligation to the public, the heating dealers of the East Bay Unit of the Gas Appliance Society took the first co-operative step to correct the evil. The first fact brought to light was the almost universal practice of making a price bid only and of leaving the customer's mind hazy about the details of the installation he would receive for that figure. Detailed heating specifications on which to base a bid were rare, and any dealer could promise a heating system and then for a time forestall trouble by cries of poor gas. Between two or more bids, the customer was given nothing to compare but price, and being a good shopper, he usually accepted the lowest one, regardless of merit.

Making Quality Comparisons

To make possible a quality as well as a price comparison, the Society furnished all of its dealers with triplicate specification and bid forms bearing the seal of the organization. These forms carried spaces for filling in materials to be used, sizes of pipe and furnace to be employed, insulation needed, registers required, and items of a similar nature which were to become integral parts of the proposed system. Upon receiving two or more such bids from different dealers, the prospect began to discover that low initial cost was not nearly so important as the question of what he was to get for his money. Dealers who had heretofore feared to consider the best materials and workmanship in figuring their bid were now assured a fighting chance to sell quality, and the opportunity to compare proposed installations item by item began to bear results in satisfied customers.

Following the lead of the Oakland Unit, the heating dealers of the San Francisco Unit prepared a similar form for their own use. However, they went one step further and printed five highlights of good practice on the reverse side of the customer's copy. These highlights or recommendations actually specified the correct procedure in certain phases of installation which had been giving so much trouble under the old regime. The customer was thus furnished an additional comparison between the specifications of the bidding dealers and the recommendations of the Society. A copy of the highlights follows:

We Recommend:

1. *Furnaces of ample size. This means a minimum gas capacity of 100 cu.*

GAS APPLIANCE SOCIETY CALIFORNIA

This standard form of specification is endorsed and recommended by the Heating Bureau of the Gas Appliance Society of California, San Francisco Unit, and Heating Division of the Pacific Gas and Electric Co.

Specifications for Proposed Installation of
GAS-FIRED WARM-AIR FURNACE

For Mr. ..... Address .....

In Building located at .....

We propose to furnish and install the following:—

MAKE and SIZE of FURNACE .....

Maximum Gas Consumption .....

Type and Location of Furnace Control .....

	ROOM TO BE HEATED	SIZE OF REGISTER	TYPE OF REGISTER	SIZE OF BASEMENT PIPE	INSULATION OF BASEMENT PIPE	SIZE OF RISER PIPE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

CUTTING TO BE DONE BY CONTRACTOR

Source of Air Supply to Furnace .....

If Return or Outside Air: Size of Pipe ..... Size Register ..... Location Register .....

Vent Connected to Flue .....

Remarks .....

For the Sum of .....

SUBMITTED BY

Name .....
MEMBER OF GAS APPLIANCE SOCIETY

Address .....

Date .....

ACCEPTED BY

Name .....

Address .....

Date .....

WE GUARANTEE ONE YEAR'S FREE SERVICE

Furnace installation specifications form used by San Francisco Gas Appliance Society Unit

ft. per hour per every 5000 cu. ft. of space to be heated.

2. *Placing furnace near the center of the house.*
3. *The use of air cell covering on warm air pipes.*
4. *The use of inside cold air return where possible.*
5. *The use of copper and terra cotta vents.*

THE GAS APPLIANCE SOCIETY OF SAN FRANCISCO

N. B.—See our standard specification code for further information.

Helpful as this work was found to be, there still remained one stumbling block. There did not exist a detailed code of specifications which covered every point of the installation procedure and to which every dealer would subscribe. Much of the value of the triplicate bid forms was neutralized by the fact that quite a few technical questions were still answered in different ways by different firms. Confronted by comparison with the specifications of a rival concern each would seek refuge in a maze of data and proof. However, by revision, borrowing, and creation, the San Francisco gas-fired warm air furnace dealers finally evolved a manual or code of correct practice. Having created it, they were then asked and have agreed to live up to the letter and spirit of that code, both in figuring their competitive bids and in their actual installation practice. A copy of the code follows:

STANDARD CODE OF GENERAL INSTALLATION SPECIFICATIONS RECOMMENDED FOR GAS-FIRED WARM AIR FURUNACES

Basement Work, Including Installation of Furnace

1. GAS SUPPLY:

a. Size of gas pipe: This table is for average length of run (not over 25′): if greater, larger size pipe is recommended. For further information on gas piping, see gas company's code of sizes.

Rate gas cons. per hour. cu. ft.	50	100	150	200	300	400	600
Size of gas pipe from meter	¼″	1″	1″	1¼″	1¼″	1½″	2″

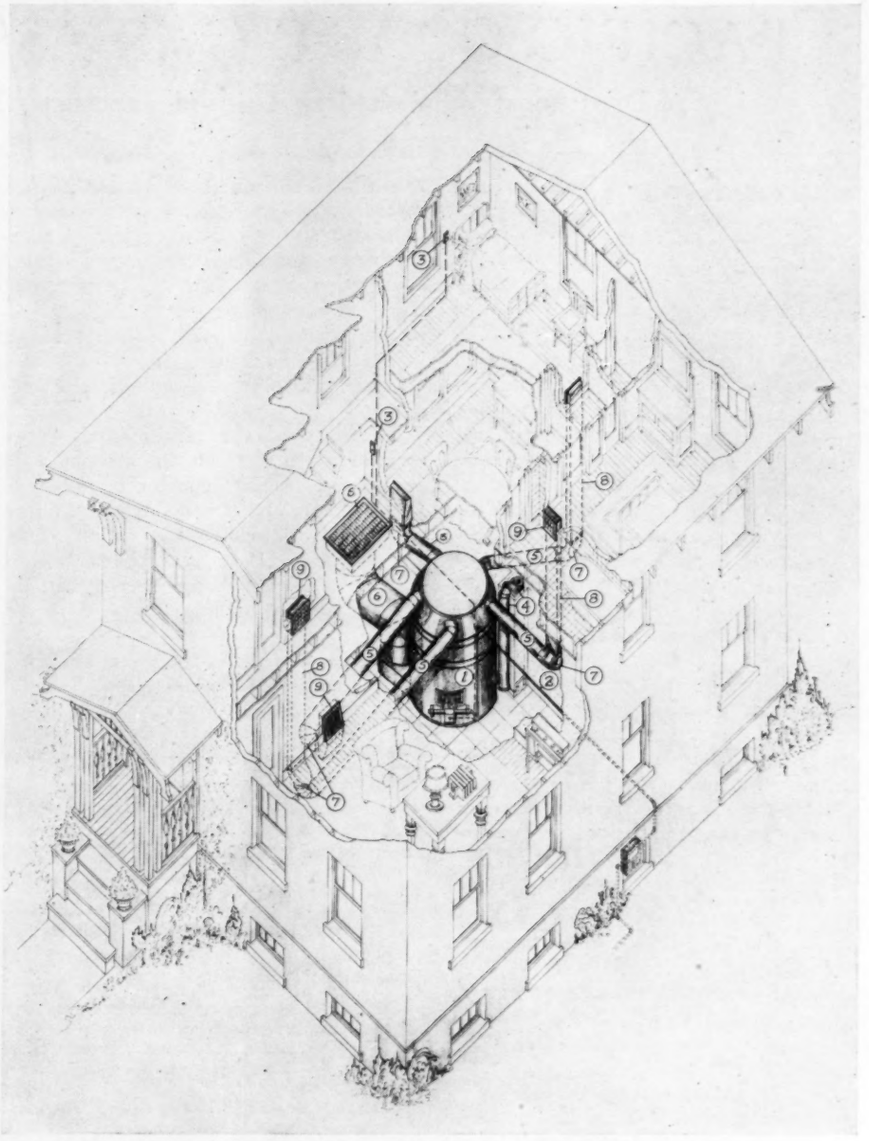
b. Location of gas pipe: There should be a separate pipe run from the meter. If a branch from house line is used, the size should be larger than the minimum given in the above table.

2. FURNACE:

a. Location: The furnace should be located as near the center of the house as possible, so as to have short pipe runs that will not exceed 15 feet in length, unless a fan is used.

b. Size: It is important that the proper size of furnace be selected. The minimum gas capacity for a furnace should provide for 100 cu. ft. of gas consumption per hour per every 5000 cu. ft. of space to be heated. The rated maximum gas capacity stamped on furnace should be checked against this requirement.

c. Top: Pipes may be taken off of either the top or sides of furnace. Do not take off some pipes on top of furnace and other pipes on side. Neglect basement "Head Room" in keeping furnace top low so as to get most pitch for leader pipes.



Phantom view of a model warm air furnace installation

3. ELECTRIC CONTROLS:

a. Kinds: Controls with two or three operating speeds are recommended so as to secure flexibility of operation.

b. Wiring: Wiring need not be in a conduit, since the current is of low voltage (same as doorbell wiring), but work should be neatly done.

4. VENT CONNECTIONS AND FLUES (OR CHIMNEYS):

a. Chimney or flue requirements: A good brick or terra cotta chimney is considered good. Should there be no such chimney, a good flue should be built on outside, and extended well above roof of house to insure a good draft. Under no circumstances should the vent merely terminate just outside the house.

b. Length of vent connection: The length of the vent connection should be as short as possible and of maximum pitch.

c. Material of vent connection: Copper pipe or terra cotta is recommended for all vent connections.

d. Number of appliances per vent connection: If necessary to vent two appliances into one vent connection, be sure that the Y is at least five feet from either appliance. Never use a T.

e. Other provisions: The vent connection should be provided with a drip T and a down draft hood unless the drip T acts as one. The flue should be provided with an A top or equal to prevent down draft.

f. Size of vent connections: The following table is minimum:

Rate gas cons. per hr. cu. ft.	50	100	150	200	300	400	600
Minimum size vent connection	3″	4″	4″-5″	5″	6″	7″	8″

5. LEADER PIPES:

a. Insulation: One-ply asbestos air cell covering is recommended. Such insulation saves 50% of heat loss of ordinary asbestos paper.

b. Pitch of pipes: The pitch of leader pipes should never be less than 1″ to 1′.

(Continued on Page 28)

PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

Southern Regional Meeting *at* San Diego, Feb. 18, 19

EVERYONE who can reasonably do so is urged to attend the Southern Regional Meeting of the Association at San Diego on February 18 and 19. The Association is forging ahead rapidly in influence and prestige, and as its responsibilities have increased it has been found impracticable to leave all important discussions and decisions to the annual convention. Necessity, therefore, has forced the enlargement of the scope of the quarterly regional meetings and while, as the name implies, the general attendance is limited largely to members of the Association living in the vicinity of the place of meeting, each meeting is attended by the officers and principal committee chairmen and by those executives who are guiding the destiny of the Pacific Coast Gas Association.

In addition to the programmed features of the meeting, the San Diego Consolidated Gas and Electric Company invites all those in attendance to inspect its new offices and plant equipment.

The schedule of meetings follows:

Thursday, February 18

2:15 p.m. — Committee Conferences, San Diego Hotel

Any member of the Association is invited to attend the sectional conference in which he is interested.

Accounting Section, Room 108
Commercial Section, Room 106
Public Relations Section, Room 107
Technical Section, Sun Parlor on Roof

4:00 p.m.—Meeting of Appliance Certification Committee, Room 108

8:00 p.m.—Joint Meeting of Board of Directors and Section Chairmen,

(Continued on Page 34)

Arizona Meeting Likely

IT was announced in the December issue of *Western Gas* that there was a possibility of the Association holding a special meeting in Arizona this Spring. The Board of Directors endorsed the meeting, but realizing the difficulty in the way of California attendance, the matter was referred to Claude Webber of the Tucson Gas Electric Light and Power Company for advice.

Mr. Webber reports that the meeting is greatly desired and should be held in Tucson on April 16 and 17, or thereabouts. Preliminary arrangements indicate that we will meet jointly with the newly organized Arizona Utilities Association, thus assuring a large attendance of men interested in all types of public utilities, not only from Arizona points but from Denver, El Paso, Albuquerque, Los Angeles and San Francisco.

As many of the southwestern companies are hard to reach, the meeting will afford an excellent opportunity for business contacts and should attract a number of our appliance and supply company members. It is hoped that the completed plans for the meeting can be announced next month.

Recent Additions to Membership List of Association

BELOW appears a list of a number of Class B and Class C memberships which have been taken out recently in the Association:

CLASS B, MANUFACTURERS:

Northwest Gas & Electric Equipment Company, Pittock Block, Portland, Oregon; represented by Mr. W. M. Kapus, President.

Pacific Gas Radiator Company 1740 W. Washington Street, Los Angeles, California; represented by Mr. A. J. Hartfield, President.

CLASS C, INDIVIDUALS

W. R. Alexander, Asst. Engr., Distribution Dept., Pacific Gas & Electric Company, San Francisco, Calif.

E. H. De Garmo, Assistant Chemist, Los Angeles Gas & Electric Company, Los Angeles, Calif.

A. R. Fox, Chemist, Western States Gas and Electric Company, Stockton, Calif.

Robert F. Harper, Head Credit Division, Portland Gas & Coke Company, Portland, Oregon.

F. W. Hatch, District Manager, Pittsburgh-Des Moines Steel Co., 347 Rialto Bldg., San Francisco, Calif.

H. H. Jones, Vice Pres. and General Manager, Western States Gas and Electric Company, Stockton, Calif.

H. R. Mayer, Southern Calif. Representative Tappan Stove Co., 923 East 3rd Street, Los Angeles, Calif.

Sumner C. Palmer, Jr., Manager Securities Dept., Mountain States Power Company, Tacoma, Washington.

Victor J. Robbins, Engineer Gas Distribution Dept., Los Angeles Gas & Electric Company, Vallejo, California.

L. E. Seeber, Construction Foreman, Distribution Dept., Pacific Gas & Electric Company, Vallejo, Calif.

C. F. Wieland, Consulting Engineer, 703 Market Street, San Francisco, California.

The following Los Angeles Gas & Electric Corporation employees have recently taken out individual memberships: Geo. F. Code, assistant chief gasmaker; Louis Leidel, chief purifierman; A. H. Lewis, chief gasmaker; T. F. McDonnell, foreman; J. M. North, assistant foreman; F. G. Sharp, clerk.

Southern Counties Gas Co. Has Progressive Policy

JUDGING from press clippings coming to the Secretary's desk, the Southern Counties Gas Company is leading all other Pacific Coast gas companies in the important matter of public information. Just as disease fails to thrive in light, clean places, so mistrust and suspicion are banished by a constant reiteration of facts. The Southern Counties enlists the aid of its district managers in this effort and through frequent press statements, luncheon talks and advertisements the public is kept fully informed as to the history, operating details and local plans of the company. Through its representatives the company is a booster for every community which it serves and identifies itself strongly with the progress of the community by giving full details as to extensions, payrolls and local expenditures.

Water Gas Committee Personnel

The personnel of the Water Gas Committee of the Manufacturing Processes Bureau is announced as follows by Mr. F. C. Hawks as Chairman:

Jas. J. Ferrari, Puget Sound Power & Light Co.

F. W. Olsen, Mountain States Power Company

F. H. Ripley, Puget Sound Power & Light Company

W. D. Wilcox, East Idaho Gas Company.

Correction

The January issue of *Western Gas* carried the announcement that the pamphlets comprising the subject matter of the course in gas engineering being given at Columbia University under the auspices of the American Gas Association could be purchased for $10. The cost should have been published as $12. Orders for the text of the course may be placed with the secretary of the Pacific Coast Gas Association, or with Prof. J. J. Morgan, Columbia University, New York City. The cost of the entire correspondence course, including pamphlets, syllabus and instruction, is $60.

A. E. HOLLOWAY RETIRES AS SAN DIEGO CHAMBER PRESIDENT

A. E. Holloway, superintendent of the commercial department of the San Diego Consolidated Gas and Electric Company, has concluded a successful term as president of the San Diego Chamber of Commerce.

What *Is* Good Natural Gasoline?--*A* Discussion *from the* Standpoint *of the* Refiner

By CARL J. VON BIBRA
Export Refining Corporation

CONDITIONS involved in determining what is good natural gasoline are largely commercial and not scientific, according to Mr. von Bibra, author of the accompanying paper which was delivered at the natural gasoline group session held during the Los Angeles convention of the American Petroleum Institute. The discussion of the topic is therefore primarily commercial, as the author states in his conclusions.

Mr. von Bibra's remarks are made from the standpoint of the refiner rather than the natural gasoline operator. He discusses the present market situation in California, in which the advantage rests with the natural gasoline manufacturers, and goes on to forecast developments in the motor gasoline field which will affect the natural gasoline industry. Two of these have particular significance. By the spring of 1927, at the latest, according to the writer, cracking plants will have been put in operation by the major refiners of California and considerable quantities of cracked gasoline will be produced. It is predicted further that in the near future a lower quality of motor gasoline will be on the market than at present. These developments, if they transpire as outlined, will vitally influence natural gasoline market conditions. Extensive substitution of cracked gasoline for natural gasoline, and a general decline in the standard of the motor gasoline refined, would undoubtedly play some havoc with demand. Mr. von Bibra's discussion of the situation is worthy of a careful reading by everyone interested in the future of the natural gasoline industry in the West.

The paper is being published in two installments, the second to appear in the March issue.

IT IS not the purpose of this paper to propose any new specifications for natural gasoline, or to suggest any modifications in its method of manufacture. The viewpoint from which this is written is that of the California refiner rather than that of the manufacturer of natural gasoline.

The object in view is to stimulate thought along lines which will help both the refiner as a purchaser of natural gasoline and the gasoline manufacturer as a seller of a single commodity having but one buyer. It is obvious that the refiner will buy natural gasoline only as long as he can make a profit by doing so. It is therefore incumbent upon the natural gasoline manufacturer to furnish the refiner with a commodity which it will be profitable for him to buy, not only today and perhaps next year, but over a long period of years, for only in this way can the natural gasoline manufacturer assure the stability of his business with its large investment in plant and pipe lines.

Market Conditions

At the present time in California, the natural gasoline market is entirely in favor of the gasoline manufacturer. There is an actual shortage of natural gasoline in this state. Current stocks of the product have dropped month after month until they are now a little less than a three day's supply. It is improbable that a further shrinkage in stocks is possible, as a three days' supply represents practically nothing more than the amount of gasoline which it is necessary to retain in the shipping and receiving tanks of the seller and buyer to take care of current movements, and in addition the actual amount of gasoline in transit. A mere matter of three years ago, natural gasoline in California was selling in large valumes at five cents a gallon, and even less. As a matter of fact, there was a period of several months during which there was absolutely no market at all. None of the refiners wanted to buy it at any price. At the present time contracts for delivery over periods of one to five years are being entered into in which the prices to be paid the natural gasoline manufacturer for his product vary from three cents under the open market price for gasoline at service stations at Los Angeles or San Francisco (tax excluded), to as high as one-half cent "under." Spot sales are negligible as practically all the natural gasoline produced in California is now contracted, but such few sales as actually are being made vary from one and one-half cents "under" to a slight premium. With finished motor gasoline bringing the refiner anywhere from six cents to eight cents under the retail market at refinery or tidewater, it is obvious that no money can be made by refiners from the use of such high priced natural gasoline unless the use of this natural gasoline enables them to make a real profit in other ways. This matter will be given consideration in a later portion of this paper.

Cracked Gasoline

In a market such as that which is at present being enjoyed by natural gasoline in California, the refiner very naturally attempts to make marketable motor gasoline by using as little natural gasoline as possible. It happens that this winter particularly keen competition has developed among the major marketing companies in providing the motoring public with exceptionally quick starting gasoline. This unquestionably has redounded to the great benefit of the natural gasoline manufacturer since it is impossible now for the California marketing concerns to make a quick starting gasoline in quantity except by the liberal blending of their straight run refinery product with natural gasoline. There is, however, absolutely no reason to believe that such conditions will continue for very long. Practically all of the major refiners of California have at present well developed and large scale programs for the installation of efficient and thoroughly tested cracking processes. Some of these cracking plants are now under construction; others are due to be started very soon.

The result of all this activity will be that in the latter part of this year, and certainly by the spring of 1927, there will be produced in California very considerable quantities of cracked gasoline, whereas at present time the production of this commodity is practically negligible. The cracking plants now being installed or contemplated will be able to furnish the refiners with practically any required quantity of low boiling hydrocarbon fractions at a cost comparable with the cost of producing cracked motor fuel. These low boiling fractions of cracked gasoline can be cut so as to practically duplicate natural gasoline in all respects with the exception of gravity and odor. We can safely discount the disadvantage of the odor of this product since there is absolutely no question but that the public will be educated to use cracked gasolne, either alone or blended with the straight run refinery product, just as the public east of the Rocky Mountains has been educated to do the same.

Likewise, we must consider the question of low gravity cracked gasoline. At the present time much natural gasoline is being bought by refiners, not only to

(Continued on Page 28)

EDITORIAL

Beginning the Appliance Course

OVER 200 men gathered in Los Angeles on January 12 to start the comprehensive course of study of gas appliances which is made available through the activities of the Gas Appliance Association of Southern California. No better indication than this splendid enrollment is needed to demonstrate the field which exists for education in the appliance industry, and to demonstrate further that those engaged in the industry appreciate this need.

During the course of 15 weekly lectures these appliance students will listen to authoritative discussions of the many problems of the industry, from gas manufacture and distribution to sale of appliances. Completion of the study should find them possessed of a broad appreciation of the field in which they work, and valuable additions to their practical knowledge of the appliance business will undoubtedly have been made.

Through the co-operation of those in charge of the pereparation and direction of the course *Western Gas* is able to present the substance of the lectures to our readers. The treatment of the topics will be comprehensive, and will afford the best possible substitute for those who cannot personally attend the lectures. Students enrolled in the course will find this series of articles helpful as a permanent record of study carried on. Our appliance readers everywhere should follow our monthly reviews closely and profit from this valuable material.

The first lecture of the series, delivered by the director of the course, Walter M. Berry, deals with gas manufacture and is published in this issue.

The Trade Press and the Industry

THE position of the trade press as a helpful factor within any industry has been well established in the past two decades. The last ten years have seen the launching of a host of industrial publications, and their growth is sufficient evidence that they are filling a need within their several fields. It may be said with equal truth that their growth is evidence of development within the industries they represent.

Alexander Forward, secretary-manager of the American Gas Association, pens the following pertinent remarks on the trade press in the American Gas Association Monthly for December:

"It is an axiom of modern organization that an industry cannot grow faster than its trade press. The adequacy of trade papers to fulfill their task is dependent upon the support they receive. Sometimes a publication is far ahead of the industry whose progress it records, but it cannot long remain so.

"The dissemination of information conducted by trade papers cannot be duplicated in any other way, for the trade press is the mirror of our progress."

This is the ideal of every trade publication—to mirror the progress of its industry. But before that desired condition can result, two things are necessary. There must be progress to mirror, and also, the journal must have co-operation in presenting a true and adequate account of that progress. Here in the West there are abundant evidences of advances in the gas industry. It remains for contributors to that progress to see that it is broadcasted through the columns of *Western Gas*. Let the whole industry keep abreast of developments within its ranks.

Refrigeration in the West

WE see much publicity in eastern publications written in the cause of gas refrigeration. Beyond a doubt gas refrigeration is due to lend a hand in bringing up the summer load, and our guess is that western companies will not be backward in pushing the development of this load at the earliest feasible moment. Several companies have under way the preparation of sales plans to be put in operation the coming spring, with shipments of regrigeration apparatus already booked with manufacturers. Big strides have been made in the development of gas refrigeration apparatus, and further experimentation is necessary. The more encouragement the gas man lends to this experimentation the sooner will he profit from it.

Passing in Review

IT is often helpful, and sometimes inspiring, to look in retrospect over the accomplishments of a year that has just come to a close. An article in this issue presents a review of outstanding 1925 activities of a considerable number of western gas utilities, and also forecasts a few important 1926 developments.

Building Gas Sales *through* Loan *of* Appliances

By S. J. HALLS

Victoria Sales Manager, British Columbia Electric Railway Co., Ltd.

IN order to increase gas sales as rapidly as possible the Victoria, B. C. gas department of the British Columbia Electric Railway Company, Ltd., recently extended exceptional terms on gas ranges and water heaters, provided the premises to be served were on the Company's existing mains.

The Company offered to provide, at no expense to the consumer, and to install and connect up in the kitchen, all ready for use, a specially selected gas range and tank water heater; in return under this arrangement the consumer was asked to guarantee a monthly minimum consumption of 3000 cubic feet of gas at the regular rates. If the customer wished to purchase the equipment, easy terms of $1.00 down and $1.00 monthly were arranged for. Under the purchase system a monthly minimum charge for gas of only $1.25 is required.

Many Installations Made

Close upon 300 installations were made under the above plan during the first two months and the indications are that a very large number will be put in during the spring months, 1500 being the total objective aimed at. So far about one half the installations made have been on free loan, the remainder purchasing the equipment.

As soon as possible after an installation is put in a lady from the Home Service Department calls to make sure that the appliances are satisfactory, in good working order, and are being used to maximum efficiency. Instruction is given in how to use the equipment and assistance extended in baking, general cooking, fruit canning, etc. The Home Service Department study the wants of the housewife so that consumers will feel the gas company is vitally interested in their home problems relating to gas service, and it is felt that this department is of very great importance in bettering public relations, tieing in as it does with publicity, saleswork, and establishing confidence between the Company and the consumer. Many expressions of appreciation have been received in respect to the work done by the Home Service representatives.

One encouraging feature of the present campaign has been that ordinary sales of the better equipment at regular list have not been interfered with to any extent.

Plan Used Previously

The idea of loaning out appliances is not a new one with the local gas department, as about 20 years ago a somewhat similar arrangement was put into effect with gas ranges, for about a year, with very gratifying results. The equipment selected at that time lasted remarkably well for many years, and only recently the last of the few remaining out were replaced with modern ranges. It was found on the whole that consumers gave the equipment on loan very fair attention, and kept it in reasonably clean condition and it is anticipated that the present effort with the close personal touch of the Home Service Department will prove very successful.

The Victoria, B. C., office of the British Columbia Electric Railway Company, Ltd., uses its display windows to excellent advantage, as shown in the two views above

Appliance Students Gather *for* First Lecture *of* Series. Gas Manufacture *Is* Topic

381 gas companies in the United States, and the growth of the business was more rapid after the invention, in 1855, of the blue-flame burner by Bunsen, which made possible the use of gas for heating purposes. The invention of the gas mantle by Carl Auer von Welsbach gave gas a further advantage for lighting purposes.

The growth of the gas industry in this country has been phenomenal. Its capitalization has trebled in the past 10 years, jumping from $1,252,421,000 in 1914 to over $4,000,000,000 in 1924. In that same decade the total sales of manufactured gas alone have increased from 198,838,834,000 cubic feet in 1914 to 405,344,000,000 cubic feet in 1924. Those figures do not include the 278,209,000,000 cubic feet of natural gas supplied to 3,233,800 domestic consumers.

It is not strange, when we note the growth of our industry in spite of our great abundance of various fuels such as coal, petroleum, and natural gas, that other countries less favored should also show material growth in the gas industry. Some of the statistics that we have from Great Britain are particularly interesting since they show what is being done in a country geographically very small in area compared with ours and composed of people whose average wealth is much smaller than ours. For the year 1923 we find that the 790 gas companies in Great Britain supplied 259,849,500,000 cubic feet of gas to a total of 7,810,350 consumers, and there was invested in gas under-

(Continued from Page 13)

taking over 826 million dollars in capital—truly a remarkable condition when we consider the retardation of the business caused by five years of war.

The Gas Industry in California

The gas industry in California had its origin in San Francisco where, in 1852, Peter Donohue started his infant gas works at First and Howard Streets. The early coal-gas and later water-gas processes, which required the importation of coal from Pennsylvania or foreign countries, gave way to the oil-gas process invented by L. P. Lowe, then of Lynn, Mass. Mr. Lowe was the founder of the Mt. Lowe observatory near our city.

The first oil-gas plant was started in Oakland in 1902 and was rapidly adopted by other cities, until now practically all the manufactured gas in California is made by this process. Recent statistics released by the Railroad Commission show that the gas consumers in 1924 numbered 865,757, and used a total of 150,482,956,000 cubic feet of gas, for which they paid $49,478,153.

Gas Manufacturing Processes

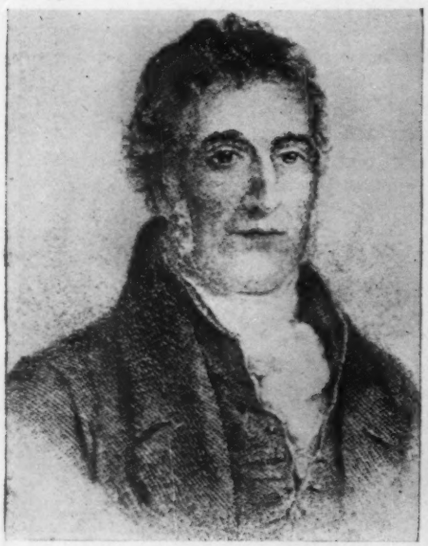
Of the total manufactured gas in the United states, about 74 per cent is carburetted water gas; 18 per cent coal gas; and 8 per cent oil gas. Of late years the attention of the gas engineer has been directed more to developments in coal-gas processes, due to the increasing price of gas oils, and to the fact that our experience during the war period demonstrated our dependence upon the by-products from coal.

By-products from coal constitute today one of the pillars of chemical industry. A well-known authority on fuel has said that to burn bituminous coal, raw, without preliminary carbonization and recovery of by-products, ought to be and probably will be some day prohibited by law.

It is of interest to note that large financial interests have for some time been considering the establishment of a great steel-producing center in our Harbor District. The success of this enterprise will depend very largely, however, upon the successful production of satisfactory-grade coke from our Pacific Coast coals. Of the two other essential raw materials—iron ore and limestone—we have great abundance. Should these plans materialize, the Bay Districts and perhaps portions of Los Angeles, may some day receive a part of their gas from the coke-oven plants maintained by the steel mills for the production of coke.

Coal Gas: Coal gas is produced by the destructive distillation of bituminous coal in externally fired retorts of refractory material. As distributed for use, it is a colorless gas with a pungent odor caused by the hydrocarbon vapors which it contains. It is of low specific gravity, being usually between 0.45 to 0.50 as heavy as air.

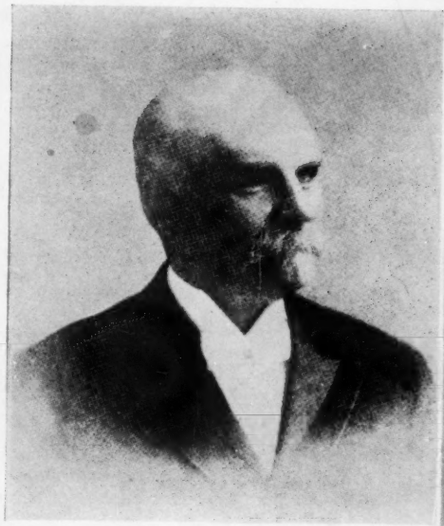
Coke-oven Gas: By-product coke-oven gas is a coal gas made in ovens designed primarily for the production of a high-crade coke that is suitable for use in blast furnaces or for other metal-



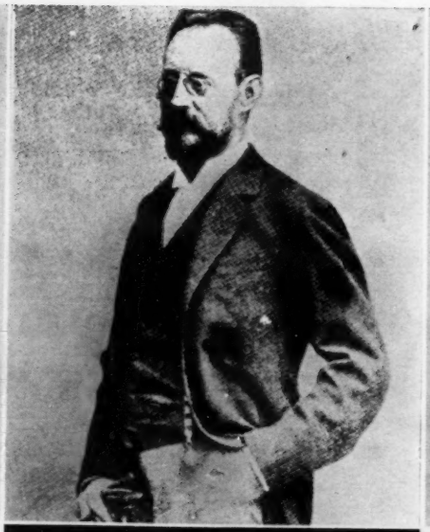
William Murdock, inventor; the first gas engineer

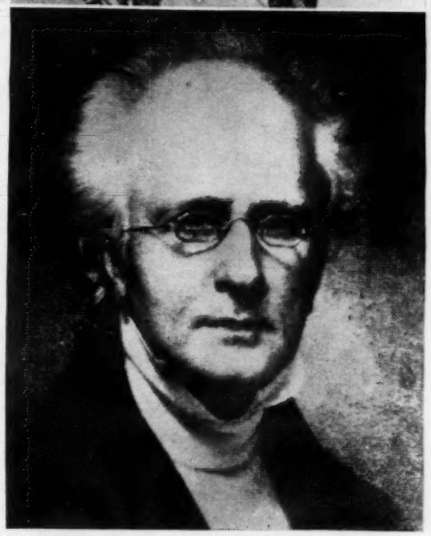
Frederick Albert Winsor, founder of the first gas company

Jean Baptiste van Helmont, who discovered coal gas

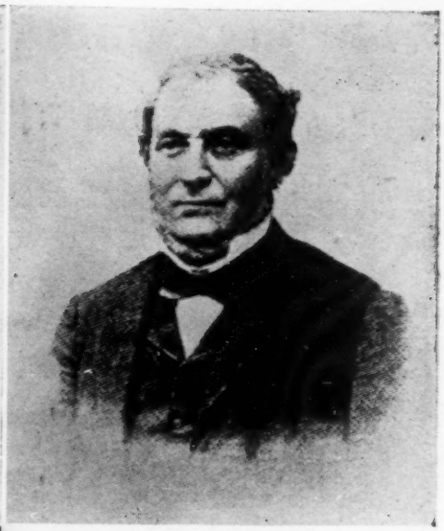


Thaddeus S. C. Lowe, inventor of the oil gas process





Top: Carl Auer von Welsbach, inventor of the gas mantle. Bottom: Rembrandt Peale, who launched the first American Gas Company



Robert Wilhelm von Bunsen, inventor of the gas burner

lurgical purposes. The coke is usually considered the primary product and the gas merely one of the by-products.

Carburetted Water Gas: Carburetted water gas is formed by the action of steam on highly heated coke or anthracite coal with enrichment by the addition of a high heating value oil gas simultaneously generated. It contains the same constituents as coal gas, but in quite different proportions. Like coal gas, it is colorless and has a pungent odor, but it is considerably heavier, being usually from 0.60 to 0.65 as heavy as air.

Oil Gas: The manufacture of oil gas is confined almost exclusively to the Pacific Coast. Oil gas is essentially the product of destructive distillation of petroleum. This accounts for the great similarity in composition of oil gas and coal gas, the former being produced from oil, the latter from bituminous coal, under such conditions that somewhat similar reactions occur. The generating machinery used for production of oil gas resembles markedly the water-gas machinery. Oil is gassified in cylindrical steel shells lined with fire brick and filled with a checkerwork of fire brick. The process bears a further resemblance to water gas in that it is carried out in alternate heating and gas-making periods.

For making 1000 cubic feet of oil gas there is required about one gallon of fuel oil to keep the generators at a proper temperature, and 8 gallons of oil weighing about 59 pounds for the gas making. There is recovered 33 pounds of gas, about 22 pounds of lampblack, and about 1½ pounds of tar. Neither the lampblack nor the tar made in the oil-gas process has any special value except for use as a fuel.

The important commercial development of natural gas in California started in the Midway-Sunset oil fields about 1908. Prospecting for oil in this district had commenced over 10 years previously, but it was not until the above date, upon the completion of a pipe line to Bakersfield, that gas was utilized very extensively.

In 1913 the Midway Gas Company constructed a 12-inch line 110 miles in length from Taft to Los Angeles. Two years later an 8-inch line was also laid from the West Coyote field to Los Angeles. About the same time other lines were being constructed by Southern Counties Gas Company for distributing natural gas produced in Orange County, thereby supplanting artificial gas in the smaller towns east of Los Angeles. Following the early developments of Coyote Hills, other important fields were discovered in rapid succession.

The principal producing fields at the present time are: Midway-Elk Hills, Long Beach, Santa Fe Springs, Torrance, Compton, Richfield, Montebello, Coyote Hills, and Brea Canyon, and quite recently the Ventura District has become a large producer. All these are connected to Los Angeles by lines varying in sizes from 8 to 16 inches in diameter.

Glendale, Burbank, and the northern sections of the city, are supplied with gas from the Kern County fields; the southern and eastern sections of the city with a somewhat different quality of gas from the Southern fields; and the city proper, and Pasadena, Alhambra, Inglewood, and Santa Monica, are supplied with mixed gas of high heating value as compared with manufactured gases, but lower in specific gravity and heating value than the natural gases.

The question is often raised, Why is it necessary to make any manufactured gas while there is the great waste of gas in the surrounding oil fields? The answer is that the wastage is not so very great during the period of our greatest heating load, and what is wasted is in the districts where the life of the wells is of too short duration to warrant the great expense of transmission mains and equipment. During the summer season when the demand for gas is small there is, of course, considerable waste, but no one has been able to persuade the oil operators to shut in their wells for the sake of saving the gas.

The supplementing of the natural gas supply during the peak winter period with oil gas makes it necessary to reduce the heating value and modify the composition of the natural gas during the other seasons of the year in order that the gas shall be fairly uniform throughout the year.

What *Is* Good Natural Gasoline *from* Refiners' Standpoint

(Continued from Page 23)

give the low initial boiling point and the quick starting property which comes with it, but also to give a high gravity to the finished motor gasoline. Assuming proper boiling range, we all know that high gravity is all nonsense, except for one consideration. This consideration is that the public mind has for many years associated high gravity with good gasoline and therefore there is a very definite advertising value in marketing a high gravity gasoline. Nevertheless, it will be very much cheaper for the marketers of motor gasoline to spend considerable sums of money in educating the public out of this high gravity notion rather than to pay tribute indefinitely to the natural gasoline manufacturer for his product when a synthetic product can be substituted at a lower cost. This is a very serious matter for the natural gasoline manufacturer and should not be dismissed lightly.

Prefer Natural Gasoline

The way the matter stands now, the refiner would prefer to continue the use of natural gasoline as a source of low boiling hydrocarbons rather than to manufacture by cracking what would be substantially a synthetic natural gasoline. Cracking is expensive, both as to initial investment and operating charges. It is dangerous at best and the manufacture of a rather narrow cut of low boiling hydrocarbons would be even more dangerous than the manufacture of the full range of hydrocarbons comprising motor fuel. This is because it would be necessary to operate at higher pressures and temperatures in order to crack a predominant amount of low boiling hydrocarbons. Then again, there is a question of royalties to the licensors of the various cracking processes. This would argue against the manufacture of a synthetic natural gasoline substitute, but none of these arguments would be strong enough to induce the refiner to continue to buy natural gasoline of poor specification or at an unduly high price rather than to manufacture a suitable substitute by cracking.

California Conditions Peculiar

The tendency of the California natural gasoline manufacturer will be to immediately reply that oil is being cracked in very large quantities in the Mid-continent and on the Atlantic Seaboard, and apparently this has not hurt the market for natural gasoline in those sections of the country. This may or may not be true. Then again, it is dangerous to compare gasoline marketing conditions east of the Rockies with those on the Pacific Coast. East of the Rocky Mountains we have a very large number of competing retail marketers of motor gasoline. Many of these are comparatively small concerns. With the exception of the area immediately surrounding Los Angeles, this is not the case in California or the other Pacific Coast states and their contiguous territory. Many small refiners are operating in the Los Angeles area who would not be financially able to install and operate cracking plants of importance and therefore presumably would continue to be indefinitely in the market for natural gasoline in order to make a quick starting gasoline which would compete at all times with the products of the larger companies. Once outside the Los Angeles area, one finds that the retailing of gasoline on the Pacific Coast is almost exclusively in the hands of a small group of major companies, practically all of whom are now installing, or about to install, cracking plants. Therefore if the major California refiners should be forced, on account of the condition of the natural gasoline market, to dispense with this product to any considerable extent, the small refiners of the Los Angeles area would be totally unable to absorb enough natural gasoline to maintain the present scale of prices. Consequently, California manufacturers of natural gasoline would be making a dangerous comparison if they judged the probable effect of cracking on the California natural gasoline industry by the effect large scale cracking has had on that industry east of the Rocky Mountains.

Lowered Quality of Motor Gasoline

In conversation with the writer, one of the most prominent men in the California natural gasoline industry recently advanced the idea that the California marketing companies will have no object in buying high priced natural gasoline for blending purposes as soon as the retail gasoline market changes in favor of the seller. Ever since the present period of over-production of crude started several years ago, the California gasoline market has been strictly a buyer's market. An ever increasing number of marketers have been and still are in extremely severe competition with one another on the Pacific Coast. All of them have a great deal more gasoline to sell than their share of the market can possibly consume. The result has been the usual sad story of lower prices, larger

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New Years Party

MORE than 4200 employees of all departments of Los Angeles Gas and Electric Corporation, their wives and children were present at a huge New Year's reception and party held on Friday evening, January 8th, in the company's main office building at 810 South Flower street, Los Angeles.

Practically every floor of the height-limit building was utilized for some entertainment feature, and the whole structure was thrown open from "cellar to garret" for inspection.

Three orchestras, all made up entirely of gas company employees, furnished music for dancing on the 7th, 11th and 12th floors.

Installation *of* Furnaces

(Continued from Page 21)

Head room should be sacrificed to get maximum pitch of pipes.

c. Trunk lines pipes: A main trunk pipe with one or two branches is recommended for certain jobs, but care must be taken to take off branch pipes so as to properly direct the desired amount of air to each room. Trunk pipes should be the equivalent in size of total of all branch pipes taken off.

d. Size of leader pipes: The size of leader pipes should never be less than 8". The following table is based upon approximate or equivalent sizes.

Size of room	10'x12'	14'x20'	16'x25'
Size of leader	8"	9"-10"	10"-12"

For large rooms (16'x25') on first floor a single leader is good if the register is of the extended baseboard type and the throat of the riser is large. Otherwise large rooms should have two or more leaders to feed them.

6. COLD AIR SUPPLY FOOR THE FURNACE:

a. Source: It is good heating practice to recirculate cold air supply from a centrally located register within the house.

b. Size of cold air supply pipe: The area of the inlet pipe must always be at least equal to the sum total area of all pipes leading from the furnace.

c. Fan in pipe: It is also good practice to use a thermostatically controlled circulating fan in the cold air intake, particularly for large installations.

Roughing-in, or Installation Work on First and Second Floors

TRANSITION FITTINGS:

Transition fittings should be made in such a manner as to change the shape of the opening without changing the cross sectional area or direction too abruptly.

8. RISERS:

a. Location: Risers should always be installed on an inside wall.

b. Insulation: Risers should be insulated with sheet asbestos paper not less than 10 lb. weight.

c. Offsets: Offsets of risers for second floor registers should be made with full size fittings and must have pitch upward in extending to register box fittings.

d. Size: A few minimum sizes are given below.

Thickness of partition	3"	4"
Size of riser	2½"x12"	3½"x10"

e. Throat sizes: Where sizes of partitions are larger than given above, a 4½" throat is minimum on the first floor and a 3½" throat is minimum on the second floor.

9. REGISTERS:

a. Register boxes: Double or two in one register boxes are not recommended except for special cases, such as for very small rooms; also they are undesirable because of sound travel. If baseboard register is used, the register throat, to be not less than 4" in depth, should be extended from register to leader pipe or at least to boot by cutting away the floor to make room for it.

b. Location: Registers should always be located on an inside wall and the shortest possible distance from the furnace location.

c. Types: Floor registers are registers with three or more shutters and should never be installed as wall registers but used as floor registers only. *Side wall or baseboard registers* with the regulator of the single wafer or flapper type are recommended for all second floor rooms and for medium size first floor rooms. For large rooms on the first floor where proper floor or baseboard register is not used, two side wall registers should be used.

It is good practice because of necessary carpenter work to install the same type of register throughout, preferably the baseboard type.

d. Size: Use no register smaller than 53 sq. in. of free air area for any room. Free air area of register is generally about two-thirds of overall area of register, because of allowance necessary for grills. Thus a 10" x 12" register has about 80 sq. in. of free air area. For rooms of normal exposure, with average height ceilings, in houses of standard construction, use the following table for first and second floor rooms.

Approximate or equivalent size of room	Size of register nominal or overall	Free air area Square inches
10'x12'	8"x10"	53"
14'x20'	10"x12"	80"
16'x25'	12"x14"	111"
18'x30'	14"x20"	187"

To further acquaint the community and the building fraternity that such a code of correct practice exists for the installation of gas-fired warm air furnaces, the Society will publish the code in pamphlet form for distribution to architects, builders, contractors, and the general public. Better still, the printed form will carry an architectural artist's drawing of a model furnace installation and will show the points covered by the code in picture form. By using the nine key numbers, even the layman can understand and follow the technical discussion, and can visualize a similar set-up in his own home.

Of course our problem is far from solved, but the outlook is much brighter. The mere rumor that our heating dealers are raising the standard of their work has had a healthy effect. Their co-operative effort in perfecting the code, the drawing and the specification forms has started the ball rolling, and better still the results we expect to get will pile up more and more satisfied customers for gas, the ideal fuel.

The Pacific Meter Works moved into a new office and factory home with the new year. The address of the company is now 495 Eleventh Street, San Francisco.

Group of natural Gasoline men on inspection tour of Southern California gasoline plants. Photograph taken at Signal Hill, Long Beach

Southern California Gasoline Plants Inspected *by* A. P. I. Visitors

VISITING members of the Association of Natural Gasoline Manufacturers were the guests of the recently organized California Natural Gasoline Association on Friday, January 22, on an extensive trip of inspection through representative gasoline plants of Southern California fields. Guests, and members of the California group numbered about 35.

Leaving Los Angeles at 9:30 in the morning in 10 private cars furnished by members of the California association, the group followed the itinerary arranged in advance by the California men, the program being as follows:

1. The California Gasoline Company's Plant No. 4 at Athens was first inspected.
2. Union Oil Company plant at Dominguez was the second stop.
3. A visit was next made to the Northwest extension of the Long Beach field.
4. The Northwest Gasoline Company's portable plan in the Long Beach field was visited.
5. Lunch was provided in Long Beach by the California Natural Gasoline Association.
6. Following lunch, the party adjourned to the top of Signal Hill, where a group picture was taken.
7. Inspecting of the United Oil Company's Long Beach experimental plant, where four kinds of absorption towers are under test, was next in order.
8. One of the features of the trip was the program arranged at the Shell Company's Long Beach headquarters, where a demonstration of the physical refrigeration test on which research is being made by the California Natural Gasoline Association members was run through for the visitors by L. O. Arnold of the Signal Gasoline Company, a subsidiary of the United Oil Company. The Signal Gasoline Company's apparatus was used in the test. Lively interest was evident on the part of the visitors and a number of questions followed the demonstration.

Two more plants in the Long Beach fields were scheduled for stops, the high pressure plant of the Pacific Gasoline Company, and the plant of the Bankline Oil Company, but shortage of time necessitated their omission.

9. The party went from the Long Beach field direct to the Norwalk plant of the General Petroleum Corporation at Santa Fe Springs.

10. The Santa Gertrudes plant of the Standard Oil Company was the caravan's next stop.

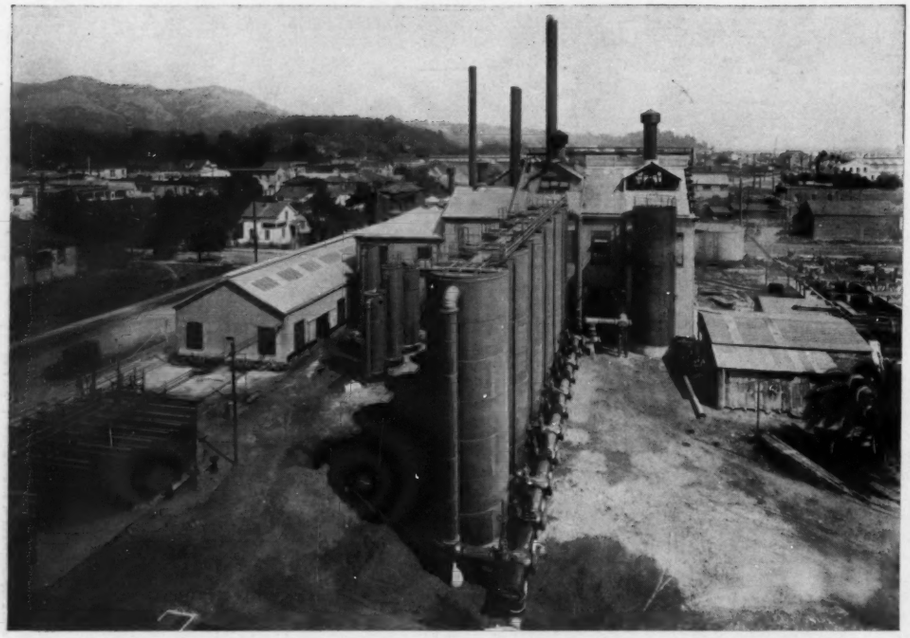
11. Another highlight of the visitors' entertainment was the courtesy dinner served all of the party by the Pacific Gasoline Company at its Santa Fe Springs camp.

Following the dinner the party dispersed and most of the members hurried back to Los Angeles to share in the A. P. I. entertainment at Warner Brothers Studios.

On the committee which arranged the itinerary and program outlined above were Paul D. Barton of the United Oil Company, J. A. Campbell of the Lomita Gasoline Company, J. S. Watson of the Shell Company, I. B. Funk of the Union Oil Company, Geo. L. Radcliffe of the General Petroleum Corporation, and R. E. Beckley of the Pacific Gasoline Company.

CALIFORNIA GASOLINE CORP. COMPLETES GAS LINE

Laying of a gas pipe line in the northwest part of the Signal Hill field, Long Beach, to connect its plant at 35th and Cedar Streets with new wells in that section, has been completed by the California Gasoline Corporation.



San Rafel gas plant of Pacific Gas and Electric Company, from which gas is transmitted by high pressure to communities in the Marin Peninsula and as far north as Santa Rosa, Calif. Daily generating capacity of this plant was increased by 2,500,000 cubic feet in 1925

Gas Utilities *of the* West Show 1925 Growth---1926 Developments Due

(Continued from Page 15)

000 over that of 1924. A natural gas delivery line from Ventura to Los Angeles, and an addition of 12 units to the company's high pressure storage system were among the principal items on the expansion program of last year. Gas sales increased 23%; 7,044 new meters were installed, and 160 miles of distribution lines were laid, together with 125 miles of transmission line. For 1926 an appropriation of about $1,500,000 is contemplated.

Palo Alto, California

The gas department of Palo Alto, serving that city, Stanford University and North Palo Alto, expended $44,929 last year, principal items called for being mains and service extensions, which covered $22,422 of the sum named. New services to the number of 359 were added.

Salinas, California

Adding 787 meters to its system and bettering its 1924 send out by about 19% are the principal 1925 accomplishments of the Coast Valleys Gas and Electric Company of Salinas, Calif. The company spent $10,728 on maintenance and betterments, and has a budget of $44,000 planned for the same purpose in 1926. The 1925 additions included: A 200,000 cu. ft. two-lift holder at Salinas ($30,000); a 30,000 cu. ft. electric compressor at Monterey ($12,000); a nine-inch purifier ($2,000) and a Root exhauster ($2,000), both at Salinas. The $44,000 appropriation for 1926 covers $41,000 for a new 30,000 cu. ft. per hour capacity gas plant at Salinas and two new compressor tanks ($3,000) at Monterey.

San Diego, California

New construction projects called for $770,000 for the San Diego Consolidated Gas and Electric Company last year, in addition to $190,000 for maintenance. This includes cost of 10 miles of transmission main, 47 miles of high pressure distribution line and 16 miles of low pressure distribution line. New meters numbered 2,400, and gas sold represented a 13.3% increase in the first nine months of last year over same period in 1924. Principal items of last year's betterments were: One 5,000,000 daily capacity generator ($135,000); a relief holder and oil storage tank ($220,000); oil scrubber ($15,000); compressor and booster ($55,000); new mains laid on account of street paving ($65,000); new mains and services called for by new customers ($250,000); new meters and regulators ($100,000); other extensions and improvements of service ($150,000). In 1926 a new gas compressor and one additional scrubber will be added.

San Francisco, California

Coast Counties Gas and Electric Company placed 845 new meters in service on its system last year, and sent out 11% more gas than in 1924. Principal items of betterment were: A hydro-electric lampblack elevator at *Santa Cruz* ($3,000); at *Pittsburgh*, Calif., an oil scrubber ($4,000), a Roots station meter ($3,500), gas works, office and storeroom ($6,500), gas cooling units ($3,000), additional scrubbers ($4,000), water system ($14,000); at *Martinez*, high pressure storage tanks ($2,500); at *Hollister*, a gas generator, washers and scrubbers ($7,500), an exhauster ($2,500). In 1926 service will be extended to *Rodeo, Pinole* and *Tormey*, communities with a total population of about 1,000.

P. G. & E. Company

The Pacific Gas and Electric Company has an extensive story of development in 1925, extending to most of the communities in northern California served by that company. Expenditures for maintenance and development totalled $5,563,310, a decrease under 1924. Gas sold increased 6.62% over the nine months of 1925 as compared with the same period in 1924; 22,000 new customers were gained for the company, and some 210 miles of distribution main laid.

Installations at the Potrero Plant, San Francisco, in 1925 included: two 18' 9" gas generators of 5,000,000 cu. ft. daily capacity each, 2 batteries of 12,000 H. P. boilers, compressors and 30,000 bbl. oil tank, gas coolers and water circulating system ($800,000). A new 36" line on Potrero Avenue ($118,000).

In *Oakland* the construction program included: a new generator of 5,000,000 cu. ft. daily capacity, 12 H. P. boilers, a 30,000 bbl. oil tank, compressors and other equipment ($550,000). Extensions and improvements to the transmission and distribution lines were completed at a cost in excess of $500,000.

At *Sacramento* another generator of 3,500,000 daily capacity, additional boilers, purifiers and compressors were added ($230,000). Extensions and improvements to the distribution system cost approximately $250,000.

The *San Jose* division spent approximately $200,000 in new mains and extensions and $100,000 in additional generating plant equipment at *San Rafael*, the gas plant capacity was increased by installation of a new generator of 2,500,000 cu. ft. daily capacity ($150,000). Other work in this division included: laying of high pressure line from *Cotati to Sebastopol*, approximately nine miles ($75,000); extension of gas service to *Mare Island* from *Vallejo* ($35,000).

In *Fresno* a new generator of 3,500,000 cu. ft. daily capacity and other necessary generating equipment were installed at a total cost of $240,000. Additions and extensions to distribution system cost $75,000.

A new 200,000 cu. ft. holder was completed at *Chico*, costing approximately $52,000. At *Grass Valley*, a new holder of 100,000 cu. ft. capacity, additional oil tanks and other generating equipment costing $50,000 were completed. The *Marysville* plant had additional generating equipment installed at a cost of approximately $20,000. Additional equipment was installed in the generating plants at *Redding, Red Bluff* and *Willows* at a total cost of $25,000.

P. G. & E. Budget—1926

The 1926 budget for the gas department of the Pacific Gas & Electric Company contemplates the expenditure of approximately $5,500,000. The largest construction job will be the erection in Oakland, of a 10,000,000 cu. ft. waterless gas holder. This installation, including the cost of land, compressor plant and necessary pipe lines will cost approximately $1,000,000.

Stockton and Eureka, Calif.

Western States Gas and Electric Company put $660,000 into maintenance and development of its gas department in 1925, laying 20 miles of distribution line, adding 725 meters, and extending its system to take in *East Stockton,* with 1000 population. Gas sold increased 7.8%. Important projects of 1925 included: at Stockton, a Jones oil gas generator ($16,000); 8,000 feet six in. high pressure main ($16,000); miscellaneous additions to distribution system ($54,000); East Stockton extension ($65,000); additional gas meters ($14,000); renew rusted mains ($13,000); improvements to gas system at *Eureka* called for $32,000.

For 1926 the company has plans for further extensive betterments. Among them are: at Stockton, property for future gas holder ($40,000); 3,000,000 ft. Jones oil gas generator ($140,000); Koppers liquid purification system ($40,800); 250,000 ft. compressor ($30,000); 10,000 ft. high pressure mains ($17,500); additional gas meters ($35,000); distribution system ($390,000); improvements to gas plant at *Eureka* are allotted $35,000.

Denver, Colorado

Approximately $450,000 was spend by the Public Service Company of Colorado for maintenance and betterment, representing $150,000 over the 1924 figure. Installation of 5,600 new meters and 28 miles of mains, to serve an additional population of 28,000 in the city of Denver featured the year. Gas sales increased 7.8%. Important additions to the Denver gas plant include: 650,000,000 cu. ft. per hr. Connersville rotary displacement meter ($3,750); a 200,000,000 cu. ft. per hr. Connersville rotary displacement meter ($12,250); coke screens ($4,500); water gas blowers ($10,000); Payne-Deane electric control valves for boosters ($1,700); routine refills for gas benches ($12,000); 700 h. p. Heine boiler, moved from electric to gas plant ($20,000).

In 1926 the company anticipates spending over $1,000,000 for development and maintenance of the gas department, principal expenditures being for a coke oven and blue water set at Denver ($675,000), and natural gas lines to *Fort Collins* and *Cheyenne* ($400,000).

Grand Junction, Colorado

A gain of 68 meters and an increase in gas sold of 8% is reported by the Grand Junction Electric, Gas and Manufacturing Company.

Greely, Colorado

The Greeley Gas and Fuel Company's returned questionnaire shows an expenditure of $11,254 in the first 10 months of 1925, a gain of 85 meters, and a 3% increase in gas sales.

Hilo, Hawaii

From far off Hilo, Hawaii comes a report of $5,000 spent last year for maintenance and development (a $2400 increase over 1924), a 14% gain in gas sales, extension of service to two new communities and installation of 285 new meters.

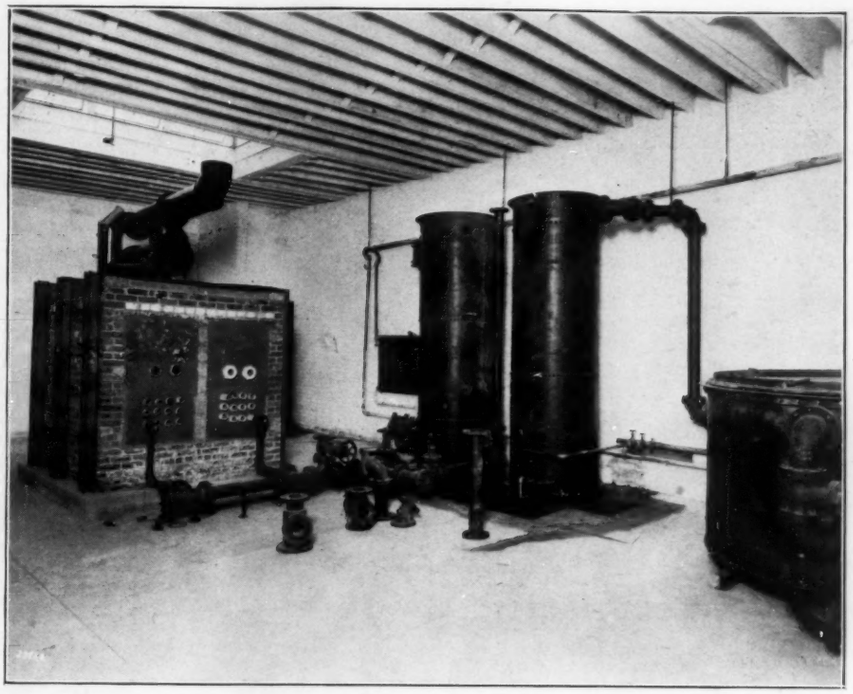
Great Falls, Montana

The city of Great Falls, Montana, spent $14,000 in 1925 on its gas department, and will spend $30,000 in 1926, one item calling for reconstruction of a water gas machine. A tar still of 2000 gallon capacity was built in 1925 at a cost of $2200.

Helena, Montana

A decrease of 0.67 in gas sales was registered by the Helena Light and Railway Company's gas department in 1925. The company spent $6500 on its gas service maintenance and improvement.

(Continued on Page 32)



Generating Room, Gas Bond and Share Corporation Plant, Long Island City, New York. This twin-unit Bean Process generator (photo taken prior to final hook-up) is capable of a maximum production of 12,000 cubic feet of gas per hour.

High Quality Gas *from* Cheap Oils

(Continued from Page 19)

that diameters and temperatures may be varied to secure the best results at each stage of the operation. The generator, while a continuous tube coil, is divided into four distinct sections, each of which has a separate function. The entire operation is under automatic control.

The first, or upper section, is an ordinary steam coil into which water is admitted through a needle valve when the temperature of the coil has reached the proper point. The function of this section is simply that of the steam boiler.

From the first section the steam passes into the next lower section of similar tubing, but of greater cross-sectional area, where it is subjected to greater direct heat preparatory to entering an expansion and vaporization chamber where it reaches a temperature which has been found requisite for the ready decomposition of steam into its elements—hydrogen and oxygen. A catalytic agent assists decomposition at this point.

The vapors pass from the second section, through a broken-off inlet pipe, to the third section which consists of enlarged cylinders connected in series. Centered in the inlet pipe there is a smaller tube through which the preheated oil is admitted and raised by the surrounding steam to temperature sufficient for "cracking". The gaseous mixture breaks abruptly into the cylinder for expansion and vaporization, is again expanded and constricted in the second cylinder, and the elements passed and repassed for altered juxtaposition and the formation of new heat-yielding hydrocarbon compounds.

The vapors are admitted through a constricted inlet to the fourth or lowest section of the generator where again alternate constriction, expansion and whirling, with altered juxtaposition, take place. The temperature of this section is held at or about the known temperature of gas fixity (1180 to 1200 deg. F.), and is never allowed to go up to the temperature of combustion. As oxygen does not combine with carbon until the temperature of combustion is reached the resultant fixed gas is virtually all hydro-carbon, non-poisonous, and of high thermal quality, carrying free oxygen and some free hydrogen with it.

The fixed gas discharges from the fourth section and is ready for scrubbing and purification, according to the usual practice.

DEATH TAKES L. A. G. & E. WORKER

Charles E. Barschig, Jr., for 24 years in the service of Los Angeles Gas and Electric Corporation, passed away at his home in Los Angeles on January 17, after an illness of several months. Mr. Barschig made his start with the Corporation at the beginning of 1902, and for the last 12 years had been storekeeper for the company. He is survived by his mother and his widow, one son, Carl E. Barschig, who is also employed by the Corporation, and several brothers and sisters.

An end view of orifice meter set-up recently installed at Los Angeles Gas and Electric Corporation's Gas Works

The Measurement *of* Natural Gas

By M. J. CEREGHINO, *Engineer, Gas Works*
Los Angeles Gas and Electric Corporation

THE development of meters suitable for the accurate measurement of natural gas in large quantities, and under high pressure, is a development of recent years. There are a number of different types of meters which have been used for this work, with more or less success. However, the one which has attained an outstanding position for natural gas measurement is the orifice type of meter.

70,000,000 *Cubic Feet a Day*

Recently, at the Los Angeles Gas and Electric Corporation's gas works, we have constructed an orifice meter set-up which is capable of measuring approximately 70,000,000 cubic feet of natural gas per day, and we believe this to be among the largest capacity single units so far installed. This meter is used for the measurement of high pressure natural gas delivered by Midway Gas Company from the Taft field, a distance of 125 miles from Los Angeles, and for gas delivered by Southern Counties Gas Company from the Venutra field, a distance of 80 miles. In the process of measurement, each of these gases separately passes through two distinct meters, thereby obtaining a double check on the measurement of the gas received from each source. The first meter in each circuit is of 16-inch size, and is used as a master meter. After leaving this, the gas then passes through a manifold, to which are connected three 10-inch orifice meters, which may be used singly or all together, dependent upon the load, and their registration checked against the registration shown by the 16-inch meter.

Orifice Meter Described

An orifice meter consists essentially of a circular disc, about one-quarter inch thick, with a concentric hole or orifice bored to a precise diameter whose measurement is known to the one-thousandth part of an inch. This disc is placed between two lengths of pipe, each of which is at least sixteen pipe diameters in length. By this arrangement, the gas is caused to flow with uniform motion through the pipe and through the smaller hole or orifice in the disc. The orifice being smaller than the interior diameter of the pipe, causes a restriction to the gas flow, which results in loss of pressure or drop of the gas pressure in flowing through the orifice. This is known as the differential pressure. By knowing the initial or static pressure of the gas before reaching the orifice, and also the loss or difference of gas pressure on the two sides of the orifice, it is possible to calculate the quantity of gas flowing through a meter of given dimensions. The static and differential pressures are recorded upon circular charts, which give a continuous record of pressure conditions existing in the meter throughout the 24 hours. By suitable calculations, it is possible to determine from the static and differential pressure the velocity with which the gas was flowing through the pipe, and then, by knowing the interior diameter and cross sectional area of the pipe, the total quantity of gas flowing may readily be calculated. Before each orifice meter, the size of the pipe, size of the orifice, and other important factors are determined and combined into a single factor or coefficient, which permits convenient computation after computing the records of the chart.

C. B. BABCOCK COMPANY MOVES LOS ANGELES OFFICE

The C. B. Babcock Company announces that its Los Angeles address is now Room 1029 Los Angeles Gas and Electric Corporation Building, 8th and Flower Sts. The headquarters were formerly in the Rives-Strong Building.

LA MESA OFFICE OPENED

The San Diego Consolidated Gas and Electric Company opened its fifth branch office on December 15th, at La Mesa, to accommodate the 2500 gas and electric customers residing in that district.

HOLLYWOOD COMMERCE CHAMBER CHOOSES GAS FOR HEAT

Twenty-two cast-iron radiators will be used in the new home of the Hollywood Chamber of Commerce, this equipment being furnished by the Pacific Gas Radiator Company.

Utilities Show 1925 Growth

(Continued from Page 31)

Shelby, Montana

The Great Northern Utilities Company's 1925 appropriation was $5,500; 62 meters were installed and a gain of 33 1/3% in gas sales was witnessed in 1925. A new regulator station was built at a cost of $1,500, and 7 miles of distribution mains were laid.

Carson City, Nevada

The Carson City Coal Gas Company made a gain of 10.4% in sales in the first nine months of 1925 as compared with the same period in 1924.

Reno, Nevada

Truckee River Power Company's maintenance budget for the gas department at Reno was $9,297; for gas plant, $19,507. Gas sales increased 9.8%. The budget for 1926 is $29,220.

Albuquerque, New Mexico

The Albuquerque Gas and Electric Company gained 120 meters in 1925, spending $77,136 and increasing sales of gas by 8.2%. Expenditures included costs of: a new bench, scrubber standpipes of 70,000 cu. ft. daily capacity ($10,000); American wet station meter, capacity 40,000 cu. ft. per hour; 60,000 cu. ft. per hour booster, five pounds pressure; building to house meter and booster—total cost, $12,828; tower scrubber, 30" by 35' high ($2,484). In 1926 a belt-line now under construction will be completed to supply the north and northwest sections of the city, at a cost of $21,688.

Isthmus of Panama

The Panama-Colon Gas Company is making a considerable extension to serve U. S. Army and Navy quarters, at *France Field, Fort Davis, Fort Randolph,* and *Coco Solo,* on the Atlantic side of the Isthmus. These installations call for 50,000 feet of four-inch high pressure pipe and will cost about $100,000. The pipe has been covered with two layers of protective material and is being welded as laid, being the first welded line on the Isthmus.

Portland, Oregon

The sum of $55,674 went toward maintance and development of gas properties for the Pacific Power and Light Company, being a decrease of $33,887 under the 1924 appropriation. A new gas bench was installed at a cost of $11,262 at *Pendleton,* and a gas exhauster also ($1,000). To mains and service extensions $17,198 was expended. A budget of $64,354 has been set for this year. Some of the improvements due are: at *Walla Walla,* gas bench improvements ($5,154); coke pusher and conveyor ($10,000); gas main reconstruction ($1,200); at *Lewiston,* gas exhauster ($1,500); gas main at *Yakima* ($3,500); main and service additions to general system ($17,000).

Portland Gas and Coke Co.

In 1925 the Portland Gas and Coke Company appropriated $2,510,335 to development and $293,869 to maitnenance—increases, respectively, of $1,649,179 and $78,125 over 1924. New meters added totalled 9,152 and 106 miles of distribution main were laid. A 10.4% gain in gas sales was marked. The budget given above provided for the following principal expenditures: transmission mains ($360,000); distribution mains ($250,000); services, meters and regulators ($225,000); miscellaneous equipment ($150,000); two gas generators ($130,000); three gas purifiers ($60,000); two waste heat boilers ($125,000); holder and holder site ($390,000); compressor ($160,000).

For development in 1926 the company has set aside $687,365, with $265,984 appropriated for maintenance. Some of the betterment items are: distribution mains ($220,000); services, meters and regulators ($230,000); new generator bldg., part ($63,000); miscellaneous equipment ($174,000).

Salem, Oregon

A slight increase in gas sales resulted in the operations of the Portland Electric Power Company in Salem; $13,901 was expended, 72 meters added, and $8,000 appropriated for 1926 betterments and maintenance.

El Paso, Texas

A 10% increase in gas sales occurred in the El Paso Gas Company's operations, with addition of 389 new meters.

Provo, Utah

The Utah Valley Gas and Coke Company spent $27,000, making a gain of 140 meters and of 12% over 1924 gas sales.

Salt Lake City, Utah

The budget of the Utah Gas and Coke Company totalled approximately $265,000 for 1925, an increase of about $215,000 over 1924. Gas sales increased 9.6% and 2381 meters were added, to November 30. Twenty-nine miles of mains were laid. Betterments include a Hortonsphere holder of 113,000 cu. ft. capacity, with high pressure mains and compressors in the southeast part of Salt Lake City, costs being about $65,000. The 1926 budget is set at $214,000. It will cover cost of gas screening and handling equipment ($1,800), main extensions, new meters and services.

Basin, Wyoming

The Midwest-Wyoming Gas Company will spend $400,000 on a 52-mile pipe line project, extending gas service to Worland, Wyoming, a town of 2,500.

Sheridan, Wyoming

Gross expenditure for maintenance and development of the Sheridan Gas and Fuel Company was $5,160. Sales showed a 23% increase and 110 new meters were added. The 1926 appropriation is $8,500.

Spokane, Washington

An estimated increase of $4,527 expended is reported by the Spokane Gas and Fuel Company, total appropriation for 1925 maintenance and betterments being $41,239. Although 1,139 meters were set gas sales showed a decrease of about 6%. For 1926 the sum of $58,802 has been appropriated; $25,000 will go to install a blue gas water set.

Medicine Hat, Alberta

The City of Medicine Hat spent $13,000 on its municipal gas department, gaining 200 new meters and increasing sales by 7%, with an appropriation of $11,000 for 1926.

Redcliff, Alberta

The Canadian Western Power and Fuel Company, Ltd., installed 250 meters and expended $3450 last year.

Vancouver, British Columbia

From July 1st to November 30, 1925, the British Columbia Electric Railway Company, Ltd., spent $167,000 in capital expenditures for works, mains, services and meters.

Vancouver Gas Company, Ltd.

An increase in amount expended for maintenance and development over 1924 of $360,119, with a gain in meters of 2,270 and a 6% increase in gas sales featured 1925 for

(Continued on Page 34)

GAS APPLIANCE SOCIETY

A Department Conducted by F. U. Naylor, Secretary

THE annual spring convention and banquet of the Gas Appliance Society of California is to be held February 10th at the Clift Hotel, San Francisco. Following the dinner, which will begin at 6:30 p. m., a program will be presented.

A. L. Crane will give the merchants a complete outline of plans for the 1926 Gas Appliance Exhibit which is to be held this year, April 11 to 17. Other speakers are also scheduled.

At the afternoon session of the State Advisory Board the delegates from each unit will report on the activities in their localities since the last convention in August. All new business will be taken up at the afternoon business session and presented to the main convention gathering for approval at the banquet.

San Francisco Unit

Plans will soon be submitted to the local unit for instituting a co-operative inspection service on all gas appliance installations in San Francisco. This will supplement and work with the city building inspector's office and with the fire chief. J. J. Rosedale, safety engineer for the Industrial Association, is now conducting such a service for the Industrial Association, the Sheet Metal Jobbers' Association, the Sheet Metal Contractors' Association and the Clay Products Manufacturing Association. This group of industries has asked us to join with them in fostering good workmanship, and the municipal authorities have signified their desire to have us take some of the burden of inspection from their already overloaded shoulders.

Frank Mosher has placed the Bryant Warm Air Furnace on the local market for the first time. The Bryant Boiler is an old standby in the gas industry and the latest addition to the family promises to be as good.

The monthly luncheon of the Society was held Friday, January 15th, at the Clift Hotel. The main business of the meeting was the voting in of a new schedule of dues. An enlarged budget and greatly increased activities are part of our new plan.

East Bay Unit

The chairmen of the different committees, together with the board of directors of East Bay Unit, have all been busily winding up the Society's affairs for 1925 and laying plans for a wider usefulness and more active co-operation for 1926.

The entire East Bay section shows a marked growth in the output of gas-burning appliances. Herman Harris, proprietor of the Pacific Gas Appliance Company and vice-president of the East Bay Unit, reports an exceptionally good year in the output of Hoffman Automatic Water Heaters. His territory, Oakland, is ranked as the tenth city in the United States in point of sales, passing Cleveland, Baltimore and Philadelphia.

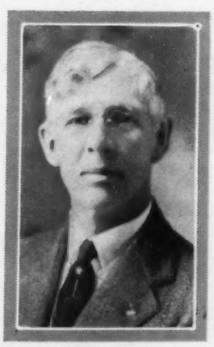
R. C. Hoyt, vice-president of the Hoyt Heater Company, reports an increase of over 50 per cent in the sale of the Hoyt Automatic Water Heater in 1925 over 1924.

It was recently decided by the board of directors of the East Bay Unit to recommend a new schedule of membership fees for the Society, it being necessary to increase the financial resources of the organization in order to be able to carry out the extensive program for 1926. It is also planned to start a membership drive immediately.

T. J. Protheroe

MR. T. J. PROTHEROE, general agent of the Southern California Gas Company, died Friday morning, January twenty-ninth, at his home in Los Angeles.

Mr. Protheroe, since coming to Los Angeles 15 years ago, has continually been identified with the Southern California Gas Company, and has, more than any other one man, contributed to the application of gas to industrial uses. He was one of the first to see the possibility of applying gas to the needs of both small and large industrial organizations, and he continually bore in mind the advantage to Southern California which would accrue from the use of this efficient economical power. From installations of natural gas engines for operating pumps in water systems, to the use of gas as a fuel in glass and steel furnaces, Mr. Protheroe was a pioneer.



T. J. Protheroe

He was well known in a wide circle of civic and industrial organizations on the Pacific Coast, in which he held several positions of high importance.

"HOME-MADE" COOPER CALENDAR IS PRACTICAL GIFT

The C. & G. Cooper Company, Mt. Vernon, Ohio, has issued another of its "home-made" calendars, consisting of 12 views of installations made in 1925. Arrangement of the calendar is highly attractive as well as adapted to easy reference.

MIDWAY GAS COMPANY HOLDS ANNUAL DINNER

On January 13 the northern and Ventura divisions of the Midway Gas Company held an annual dinner in Taft for those who have been in the employ of the company for five years or more. William Moeller, Jr., general manager of the Midway, presided. About 60 employees with their wives and children were present.

THEY DO IT IN PORTUGAL—WHY NOT IN AMERICA?

C. B. Babcock, in a letter to *Western Gas*, suggests that directors of American gas companies revert to the golden days when knighthood was in flower. Proficiency in swordsmanship must be added to the gas man's accomplishments, says Mr. Babcock. For authority he enclosed a newspaper clipping which reported a duel fought last month in Lisbon between a city councilman and a director of the local gas company—perhaps over gas rates. The Senor Councilman fell dead of a heart attack in the second round, before any gore had begun to flow.

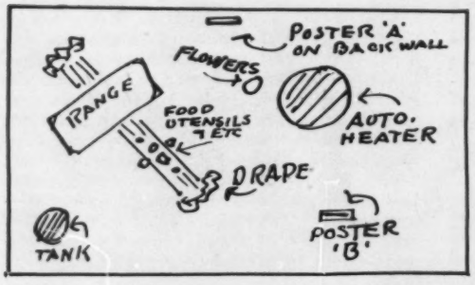
Display *for* Ranges *and* Water Heaters

TWO articles which appear in gas appliance display windows frequently, and without regard to season, since the demand for them is year-round, are the gas range and the water heater. Although the styles of each are numerous and different, the window shown in the illustration above will adapt itself to any arrangement of the same general types of appliances as those shown. Directions for reproducing the above window arrangement are as follows:

For background use a draped curtain, the material chosen largely determining the cost of the display. Place the range at a 45 degree angle on the left of the window toward the back. On the floor under the range drape a piece of velour or other suitable drapery fabric, pleated in folds. Arrange this drape in the center of the range, leading to the middle of the window. Puff both ends of the material to give a finished appearance, and place cooking utensils, flour, etc., on the drape, in a group as shown in the illustration. Place the automatic water heater in the rear and at the right of the range, and the tank heater toward the front of the window at the side of the range. Between the range and the automatic water heater use flowers or greens in a tall vase or basket, to give the needed height. Posters "A" and "B," to carry sales messages, may be displayed as shown.

In the display as described can be utilized materials that are usually on hand, and hence the cost of the display can be kept down to a minimum. While inexpensive to create, the window shown has dignity, and does not make the mistake of introducing too great variety to destroy the attention value of the separate units used.

Western Gas will appreciate receiving photographs of any window reproductions of the above display which are used by our readers.



HARRY PROWELL JOINS FORCE OF WESTCOTT AND GREIS

Westcott and Greis have made an addition to their force in Los Angeles by securing the services of Harry Prowell, who will handle the sale and maintenance of Tycos instruments. The above firm has just taken over the agency in Southern California for gas and oil equipment and laboratory supplies manufactured by the Taylor Instrument Companies of Rochester, New York.

Mr. Prowell, who comes to Westcott and Greis from a long experience in temperature control and pyrometry work, is at present at the Taylor factory, making a study of the manufacture and operation of Tycos specialties. He will work in Los Angeles in co-operation with Messrs. G. H. Unkefer and J. O. Wiley who have been identified with that company for the past several years.

NORTHWEST G. & E. EQUIPMENT CO. PROMOTES EMPLOYEES

Robert S. Felton has been appointed San Francisco representative for the Northwest Gas & Electric Equipment Company, succeeding J. P. Miller, who has resigned. Mr. Felton was formerly connected with the Los Angeles office of the company.

Guy R. Kendall, for the past four years Southern California representative for the same organization, has been appointed assistant to the president of the company with headquarters in Los Angeles.

BRICK COMPANY USES GAS

Gas fuel is more satisfactory, as well as cheaper, than oil, for burning bricks, says the King Lumber Company of Bakersfield. This testimony should be final, for during last September alone the company used 20,000,000 cu. ft. of gas in burning 3,000,000 bricks. The kilns recently constructed are served with gas from the lines of the San Joaquin Light and Power Corporation.

Southern Regional Meeting

(Continued from Page 22)

Room 108

Friday, February 19

9:00 a.m.-11:30 a.m.—General Meeting, San Diego Hotel Sun Parlor

11:30 a.m.-3:00 p.m.—A long adjournment to give an opportunity to visit the gas plant and offices of the San Diego Consolidated Gas & Electric Co.

3:00 p.m.-5:00 p.m.—General Meeting, San Diego Hotel Sun Parlor.

6:30 p.m.—Dinner

Train Schedules

In order to arrive in San Diego in time for committee conferences, it will be necessary to take Santa Fe train No. 72 leaving Los Angeles at 9:00 a. m. Thursday, February 18. This reaches San Diego at 12:50 p. m. Delegates attending from San Francisco and points north should take the Sunset Limited leaving San Francisco at 6:15 p. m. on Wednesday, February 17, (Third and Townsend St. Depot) and arriving in Los Angeles at 8:20 a. m.

For the return, train No. 79 is recommended leaving San Diego at 2:01 a. m. and arriving in Los Angeles at 7:15 a. m., February 20. This will permit attendance at the dinner and assure a good night's sleep, as Pullmans are ready any time after 9:00 p. m.

Utilities Show 1925 Growth

(Continued from Page 33)

the Vancouver Gas Company, Ltd. The total spent was $970,594. Service was extended to *Point Grey* (20,000 population) and *South Vancouver* (40,000). A 2,225,000 cu. ft. capacity installation of Glover-West vertical retorts with condensers, scrubber, etc., cost $360,000; mains, services and meters, $515,000.

Victoria, British Columbia

The Victoria Gas Company spent $162,000 in 1925, added 456 meters to its lines, and increased gas sales by 7.5%, a 500,000 cu. ft. spiral guide holder in steel tank ($125,000), three circular steel purifiers of 750,000 cu. ft. capacity ($25,000) and three-fourths of a mile of 12-inch main ($12,000). In 1926 $15,000 will be spent for an ammonia plant ($5,000), free loan of gas ranges and water heaters ($10,000) and a sulphate plant will also be erected.

The companies whose activities have been presented above are progressive—their plans for 1926 show it. And they are representative of scores of other western companies whose story would have been presented if it had been available. Naturally, the seven or eight larger companies overshadow the many smaller companies in the totals, but the growth of the smaller companies is as necessary and as serviceable to western development as is that of the larger. It is an encouraging sign to witness all classes of gas utilities, with here and there an exception, keeping pace with the communities they serve. No gas man can read of such general development and fail to find renewed confidence in the industry's future in the West.

Here are the Six Leading Types of Pacific Gas Heating Appliances — They Ventilate while They Heat.

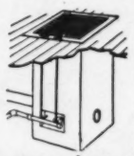
Pacific Pressed Metal and Cast Iron Radiators

An exclusive air circulation system —develops greater heat at a 25% saving in gas. Sturdier construction. Special features

Pacific Gas Steam Radiators

Provide steam heat at lower cost than a central steam heating plant. Automatic control.

Pacific Floor Furnaces

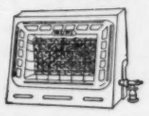


No basement needed. Just turn a key. A pilot lighh ignites the gas. Instant heat. Two different systems of heating and air circulation are scientifically combined to give greater heat and less gas.

Pacific Unit Furnaces

Installed in basement or recess and supplies heat through pipes to all rooms. Upstairs control. Automatic temperature regulation if desired.

Pacific Gas Recess Radiant Heaters



Furnished in any desired finish. An air duct supplies a continuous stream of fresh air to the casing is always cool.

This Heating Engineer's Services are FREE

With Pacific's Complete Line

Every heating installation has problems all its own. But in hundreds of thousands of installations we have met and solved about every obstacle under the sun. Our engineers are therefore qualified to help you.

FREE Service by Pacific Engineers

When you stock Pacific's complete line you have the FREE services of Pacific experts. Their experience will help you to make the *best* installation and give the greatest satisfaction on each particular job.

A Well-Advertised Line

Besides this expert service, you get quality appliances that are favorably known in your territory thtough effective advertising. You are able to carry smaller stocks. Your credits and bookkeeping are simplified. You inevitably make more money. Write for our agency proposition.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

1740 W. Washington St.—BEacon 2190 616 West 8th St.—MEtropolitan 2398

Factory and Foundry 7541 Roseberry Street, Los Angeles. Branches Throughout the West.

OIL METERS

The

EMPIRE

Positive displacement, oscillating piston design.

Different from every other type of meter.

Unsurpassed in over forty years for accuracy, durability, and low cost of upkeep.

Used with highest satisfaction by

Gas Companies

in every section of the country.

Made in all sizes, ⅝ in. to 6 in., inclusive.

EMPIRE Oscillating Piston Oil Meters are fully described and illustrated in Circular 110-W. Send postal for your copy.

National Meter Company

299 Broadway, New York

Chicago Boston Atlanta
San Francisco Cincinnati
Los Angeles

NATURAL GAS GASOLINE OPERATIONS

Compiled by J. W. MASHAW

Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE hundred and forty-two natural-gas gasoline plants, with a daily indicated capacity of 1,096,366 thousand cubic feet, of a total of one hundred and forty-six plants operating in California in December report a recovery of 29,464,070 gallons of natural-gas gasoline from 21,556,637 thousand cubic feet of gas treated. Nine natural gas gasoline plants report as being shut down this month.

Utilization of natural-gas gasoline amounted to 694,528 barrels, an increase over November of 6,063 barrels.

Stocks of natural-gas gasoline at the end of December amounted to 64,272 barrels of which 15,954 barrels were reported by natural-gas gasoline plant operators and 48,318 barrels by refinery operators. This is an increase of 7,197 barrels over November stocks.

The production of gasoline during the month of December amounted to 156,646,868 gallons, a daily average of 5,053,125 gallons. This is an increase of 3,869,308 gallons or 2.53 per cent over November output. Of this production 289,745 gallons were reported as finished gasoline produced by natural-gas gasoline plant operators. Compared to the production in December, 1924, an increase of 56,826,706 gallons or 56.94 per cent is noted. Of the gasoline produced 63,325 gallons were from using either a Cracking or Synthetic process and 156,583,543 gallons from other processes.

Stocks of gasoline show a decrease of 5,272,216 gallons during December and at the end of the month amounted to 391,844,-111 gallons. This stock figure includes 12,050 gallons of finished gasoline reported by natural-gas gasoline plant operators.

Natural gas gasoline blended at California refineries during December amounted to 448,101 barrels. The November total was 449,923 barrels.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS

December, 1925

PRODUCTION

Type of Plant	*Gas Treated M Cu. Ft.*	*Natural-gas Gasoline Produced Gallons*	*Gasoline Recovery per MCF Gas Treated*
Oil Absorption	14,215,113	18,413,038	1.295 Gal.
Compressor	300,781	199,584	.664 Gal.
Combination Comp. and Oil Absorption	4,615,281	6,924,998	1.333 Gal.
Comb. Oil and Charcoal Absorption	2,425,462	3,904,445	1.610 Gal.
Drip		22,005	
Totals	21,556,637	29,464,070	1.367 Gal.

Finished Gasoline produced at plants 289,745 Gal.

DISTRIBUTION

Stocks first of month		57,075 Bbl.
Production during month		701,525 Bbl.
Quantity mixed with crude or unfinished oils	229,632 Bbl.	
Used in blending at refineries	448,101 Bbl.	
Stocks end of month	64,272 Bbl.	
Used at Plants, Shortage and Evaporation losses	16,795 Bbl.	
	758,800 Bbl.	758,800 Bbl.

STOCKS

Natural-gas gasoline held by natural-gas gasoline plant operators	670,061 Gal. or 15,954 Bbl.
Natural-gas gasoline held by refiners	2,029,356 Gal. or 48,318 Bbl.
Total	2,699,417 Gal. or 64,272 Bbl.

Finished gasoline (motor fuel) held by natural gas gasoline operators 12,050 Gal.

TWO LONG BEACH PLANTS TO PACIFIC GASOLINE COMPANY

On January 1 Pacific Gasoline Company took over the operation of plants Nos. 1 and 2 of the Long Beach Gasoline and Refining Company, located in the Long Beach field. This transaction gives Pacific Gasoline Company three plants in operation in that field, the first being the Long Beach No. 1, which was placed in operation in July, 1924. The plants are of the oil absorption type and are equipped with steam circulating pumps.

LEE B. METTLER CO. TURNS BIG TEXAS ORDER

A single order for gas burners amounting to $28,500 was recently filled by the Lee B. Mettler Company for the Galena-Signal Oil Company of Houston, Texas, operators of refinery and absorption plants in Harris County, Texas. Mr. Mettler, president of the Los Angeles manufacturing company, claims this as one of the largest burner orders ever placed.

A. B. MACBETH ON A. P. I. BOARD OF DIRECTORS

Representing the natural gas group A. B. Macbeth, executive vice-president of the Southern California Gas Company and the Midway Gas Company, was elected to the directorate of the American Petroleum Institute during that organization's recent convention in Los Angeles.

J. C. JORDAN ATTENDS AD CLUB SESSION IN LOS ANGELES

J. C. Jordan, director of publicity for the Pacific Gas and Electric Company, was a guest of Dan C. Scott, manager of public relations for the Los Angeles Gas and Electric Corporation, at the Tuesday, Jan. 26 session of the Los Angeles Advertising Club.

NATURAL GAS FIELD IN WASHINGTON

Walla Walla Oil, Gas and Pipe Line Company, Kennewick, Wash., reports the development of a large field of natural gas, incident to oil drilling. The gas is not marketed.

POTTER Heating

For many years POTTER Engineers have pioneered the way in the advancement of modern Gas Heating Systems. They have developed Gas Heating to such a degree of perfection that today, POTTER Products have become a standard of comparison wherever dependable, safe, economical and healthful gas heating is discussed.

OUR BEST ASSET

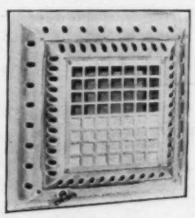
The tens of thousands of satisfied customers that our Organization has made through POTTER Gas Heating installations, is a JUST tribute to a satisfactory product—a gratification to conscientious effort.

THERE ARE MANY REASONS WHY IT IS BETTER TO INSTALL POTTER SYSTEMS

POTTER Vented Radiators

Only POTTER has these 7 POTTER Features (Cast Iron and Steel-Made)

1. Condensation abolished. This does away with corrosion. Many years are added to the life of the Radiator.
2. Triple Circulation. The heat goes into the room, not up the flue.
3. Uniform warmth distribution. The air is never "cooked."
4. Quick heat. No other radiator heats so quickly as the light, efficient POTTER Steel-Made.
5. Aristocratic appearance. The POTTER Cast Iron Radiator is selected for the finest and largest homes.
6. Totally odorless always.
7. Not expensive.



COLE Floor and Wall Heaters

Made in heavy solid cast aluminum.

COLE is the only furnace manufactured that can be installed on either the first or second floor.

"MAGIC WAY" FURNACES

"MAGIC WAY" was the first, and has always been considered the leading Unit System of heating.

The principle of Unit Heating of modern buildings, brought to its present state of refinement through the study and efforts of this Organization, is based on the principle of an individual furnace or heater for each room or group of rooms to be heated.

This type of installation allows accurate temperature control in each room, regardless of the demand in other sections of the home.

POTTER quantity production now makes "MAGIC WAY" with electric controls, available to anyone who desires a gas furnace system.

The same features that make these well known POTTER-made appliances favorites with home builders and home owners, make them popular with churches, schools, theatres, auditoriums and factories.

The low cost of adequate heating by means of "MAGIC WAY" Vented Furnaces of either the Unit or Central Plant type, will be a revelation.

"MAGIC WAY" VALVES

By merely pressing a button, the temperature of any room may be regulated. This valve not only turns the heat on but it regulates the heat to suit your exact wants.

The HALL Floor Furnace

When the furnace type of heat is desired at low cost or when a basement is not available, use HALL Vented Floor Furnaces.

Potter Heating Includes:

"MAGIC WAY" UNIT FURNACES
"POTTER" GAS RADIATORS
"RA DO" GAS RADIATORS
"HALL" GAS FURNACES
"STEEL-MADE" GAS RADIATORS
"COLE" FLOOR AND WALL FURNACES

There Is a **POTTER System** for Every Need

POTTER RADIATOR CORPORATION

San Francisco—Oakland—Los Angeles—San Diego

"Dish washing easier now"

"Seems like my new Automatic Gas Water Heater was put in just for me. It's such a help in dishwashing. Always plenty of steaming hot water when I turn the faucet—and you know what that does to greasy dishes."

Hot Water helps on laundry day, too, and is a real comfort in the bathroom.

See the Automatic Gas Water Heaters at your Dealer's.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

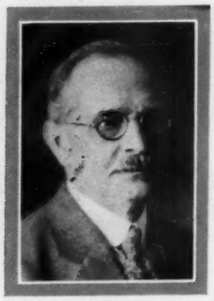
Owned · Operated · Managed
by Californians

202-226

One of the cooperative advertisements published in all newspapers in the Gas territory served by the Pacific Gas and Electric Company.

Testing Machines Bring Award *to* C. D. Bell

AWARD of first prize for the best idea to be submitted in 1925, for facilitating work in the natural gas industry, has been made by the Natural Gas Association of America to C. D. Bell, superintendent of distribution for the Southern California Gas Company.



C. D. Bell

Mr. Bell's ideas are embodied in three testing machines. The first tests all fittings before they are sent to be installed, by which faulty workmanship is detected and fittings containing leaks or defects are kept out of the lines. The other two machines are for testing meters and regulators.

Details of the ideas were worked out by F. A. Hamilton, in charge of the company's garage, and H. E. Ballard, general shop foreman. The machines were also constructed by the latter two men.

Broadcasting Food Talks

AS an added service to purchasers of gas ranges the home service department of the Tappan Stove Company has arranged to broadcast over Radio Station KNX, Hollywood, Calif., a series of food talks by Miss Virginia Tappan.

These talks will be given every Friday during 1926 at 10:30 a. m., and are designed to assist the housewife in her everyday cooking problems. "What to serve when unexpected company arrives," "Packing the lunch box" and "Making better use of the broiling oven," are subjects that will be appreciated by the busy housewife. It is estimated that several thousand housewives in Southern California tune in on these food lectures. Complete menu and recipes are given with each talk.

A Radio Cook Book is furnished to those requesting same, which contains a number of foundation recipes and enough blank pages to allow the housewife to write in the new recipes as given over the radio in the course of the fifty lectures which comprise the course.

SALES FORCE OF SO. COUNTIES IN SANTA MONICA LUNCHEON

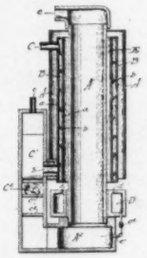
More than 20 sales representatives and officials of the Southern Counties Gas company, met at Santa Monica on Thursday, Jan. 14th, to attend the regular monthly sales meeting of that organization, held at the Santa Monica Athletic Club. The meeting was in charge of George W. Smith, newly appointed general commercial agent for the company. The sales representatives met at the Santa Monica gas office at 11:30 o'clock and after inspecting the appliance display at that office, assembled at the Athletic Club for luncheon.

George Smith opened the meeting with an interesting discussion of the company's activities in merchandising gas and gas appliances. The principle speech of the occasion was that made by C. B. Babcock, president of the C. B. Babcock Company of San Francisco. Mr. Babcock presented a very constructive talk on salesmanship which proved highly interesting to those present.

THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

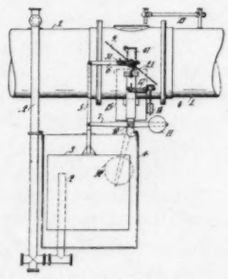
1,550,273. APPARATUS FOR MANUFACTURING COMBUSTIBLE GAS. Edward M. C. McAlpine, Chicago, Ill. Filed Nov. 25, 1921. Serial No. 517,178. 4 Claims. (Cl. 48—94.)

1. An apparatus for producing gas from liquid hydrocarbons, comprising a vertical tubular expansion chamber having a gas outlet at its upper end; a mixing chamber communicating with the lower end of the expansion chamber; an annular burner surrounding the lower end of the expansion chamber; a passageway for combustible vapors from the interior of the apparatus to the burner; an annular vaporizing chamber surrounding but spaced from the expansion chamber, the burner being adapted to



direct its hot products of combustion up said space, an inlet to said vaporizing chamber; an outlet from said vaporizing chamber to the mixing chamber.

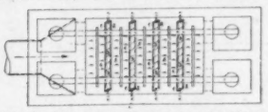
1,546,154. DEVICE FOR REGULATING THE PRESSURE AND AMOUNT OF GAS PRESENT IN, AND PASSING THROUGH, A CONDUIT. Bruno Versen, Dortmund, Germany. Filed Feb 25, 1924. Serial No. 694,911. 5 Claims. (Cl. 50—10.)



1. A device for regulating the pressure and amount of a gas present in and passing through a conduit provided with a control member, the combination of the respective conduit and its control member, with a member connected with said control member actuated by the gas pressure in the conduit for opening and closing said control member, means connected with said gas pressure actuated member providing an adjustable variable pressure tending to hold said control member open against the gas pressure acting thereon tending to close it, and a compensating member providing a variable pressure in the opposite direction to the last mentioned variable pressure means associated with said control member and gas pressure actuated member.

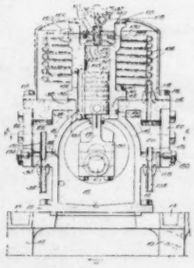
1,549,753. GAS-PURIFICATION ELECTRODE. Hans Edler, Gelsenkirchen, Germany. Filed July 23, 1924. Serial No. 727,828. 6 Claims. (Cl. 183—7.)

1. Gas treating electrode, comprising a plurality of profilated metal bars, means to deliver the gas under treatment onto said bars in a substantially perpendicular direction thereto, means for connecting said bars to an



electric circuit, means on the bars to cause the gas to flow along the bars and then to leave them substantially in the initial direction.

1,549,064. GAS COMPRESSOR. George J. Cooke, Chicago, Ill. Filed June 23, 1924. Serial No. 721,632. 11 Claims. (Cl. 230—6.)

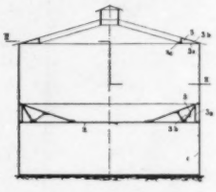


1. In a structure of the character set forth, the combination of a compressor comprising a crank-case, a cylinder, a piston operating in the cylinder, and piston driving mechanism extending into the crank case, a chamber for lubricating oil extending to one side of said crank-case and communicating with the latter below the level of the oil in said chamber, said cylinder containing an inlet port and an outlet port, said inlet port communicating with said chamber, and said chamber containing an inlet through which the gas to be compressed passes into said chamber and thence into said cylinder to be acted on by said piston.

1,550,313. PILOT AND GAS CUT-OFF. John Graf, Sr., New York, N. Y. Filed Dec. 5, 1924. Serial No. 754,146. 12 Claims. (Cl. 67—116.)

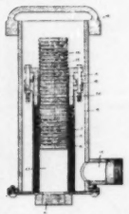
1. A pilot and gas cut-off, comprising a chamber having an inlet and an outlet, a spring controlled valve movable inwardly and outwardly of the chamber, a pilot burner on the chamber, a disk of mica supported above the burner for being heated by the flame of the pilot burner to cause the disk to move toward the burner, a clip carried by the mica disk for being moved upwardly and downwardly with movements of the mica disk, a lever fulcrumed with one of its ends movable toward and from the valve and the other end of the lever movable into and out of engagement with the clip, and a catch supported for releasably locking the valve when moved against the tension of its spring to open the inlet of the chamber and also to be releasably engaged by the lever when engaging the clip.

1,549,315. GASOMETER. Konrad Jagschitz, Mainz, Germany, assignor to Maschinenfabrik Augsburg Nuernberg, A. G., Nuremberg, Bavaria, Germany, a Corporation of Germany. Filed July 7, 1923. Serial No. 650,021. 1 Claim. (Cl. 48—176.)



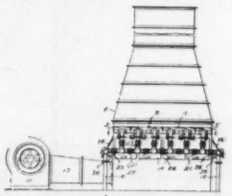
In combination, in a disc type gasometer, a gas holder of polygonal cross section and a strengthening member, said member extending inwardly from the walls of the gas holder and having at least some portions of its outer periphery in contact with the interior of the gas holder.

1,548,288. GAS PURIFICATION. Harry F. Smith, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio, a Corporation of Ohio. Filed Dec. 19, 1921. Serial No. 523,392. Renewed June 8, 1925. 9 Claims. (Cl. 183—48.)



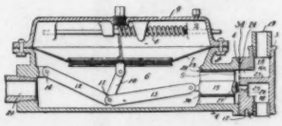
1. The method of purifying gas which consists in passing the gas through a flamentous diaphragm, and subvarying the effective area of said diaphragm to keep substantially constant the differential pressure on opposite sides thereof.

1,551,029. HEAT EXCHANGER. Roy E. Hanson, Huntington Park, Calif. Filed Sept. 4, 1924. Serial No. 735,854. 10 Claims. (Cl. 257—137.)



2. A heat exchanger comprising; a stack having a portion of rectangular cross-section with adjustable opening draft doors therein; a plurality of independently removable radiators disposed in a horizontal plane in said portion above said doors; and a piping system having branches removably connected to the radiators through interposed valves, whereby fluid may be circulated through the radiators.

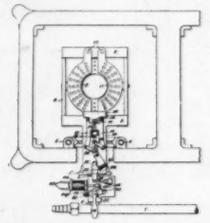
1,546,047. GAS REGULATOR. Walter I. Thrall, Pasadena, Calif., assignor to Reliance Manufacturing Company, Pasadena, Calif., a Corporation of California. Filed May 12, 1924. Serial No. 712,717. 3 Claims. (Cl. 50—26.)



1. In a gas regulator, the combination of a casing having a body with a face on its outer side constituting a fitting-seat and having a pressure chamber for the gas, a pressure reducing valve guided in the casing body to move in a plane substantially at right angles to the plane of said face and with the outer end of the valve adjacent the plane of said face, a threaded pipe fitting having a face secured against the said seat and having a port with a valve seat formed on said last named face cooperating with the end of said valve.

1,551,408. GAS STOVE. John Krasnodembsky, Milwaukee, Wis., assignor of fifteen per cent to John Gorski, Wausau, Wis. Filed Jan. 30, 1925. Serial No. 5,757. 20 Claims. (Cl. 67—116.)

1. In an automatic cut-off for gas burner valves, the combination with a burner and valve, of a thermostatic device interposed between the burner and valve adapted to hold the valve opened upon expansion and operating to release the valve upon contraction thereof, said thermostatic device including thermostatic arms disposed above the burner, a plate pivotally supporting a series of levers, connections between the thermostatic arms



and a pair of levers, means for holding the valve in its opened position, and abutment devices operated by said levers for retaining the valve opened.

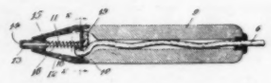
1,551,238. GAS HEATER. Vincent Chwalkowski, Newark, N. J., assignor of one-half to Monroe Sunshine, New York, N. Y., and one-half to Tobias G. Jasper, Brooklyn, N. Y. Filed Oct. 23, 1922. Serial No. 596,245. 8 Claims. (Cl. 158—116.)

1. A burner tip composed of sheet metal crimped into a series of spaced-apart hollow ribs forming interior gas passages and exterior air channels, the said ribs having branch portions extending transversely across the air channels to provide air discharge openings at the end of the tip, and the said ribs and branch portions

having their gas passages terminating in slit-like flame ports substantially surrounding said air discharge openings.

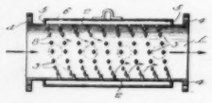
1,550,901. ELECTRIC GAS LIGHTER. William Greenfield, Philadelphia, Pa. Filed Feb. 12, 1924. Serial No. 692,216. 7 Claims. (Cl. 175—116.)

7. An electric gas lighter including a casing; a terminal plate; a cap securing the terminal plate to the casing; an electrode secured to the plate and extending out of the cap; a guard sleeve slidable on the electrode and in the cap, a shoulder on the sleeve engaging the



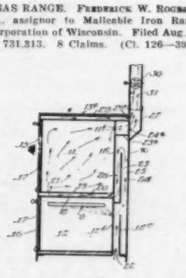
cap for preventing outward movement, and resilient means for keeping the sleeve over the end of the electrode.

1,547,381. GAS-BURNER CARBURETOR. Page Golsan, Kansas City, Mo., assignor to The Great Western Portland Cement Company, Kansas City, Mo., a Corporation of Missouri. Filed Nov. 3, 1924. Serial No. 747,619. 2 Claims. (Cl. 158—118.)



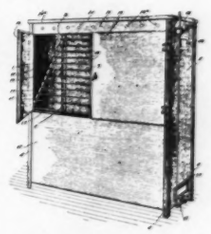
1. A gas burner carburetor comprising an air pipe, a gas barrel around a portion of said pipe and having gas inlet means, and gas feeding nipples projecting from said portion of the pipe into the interior of the latter and communicating with said gas barrel, said nipples being of different lengths to effect agitation of the air passing through the air pipe, insuring thorough mixing of air and gas.

1,550,096. GAS RANGE. Frederick W. Rogers, Beaver Dam, Wis., assignor to Malleable Iron Range Company, a Corporation of Wisconsin. Filed Aug. 11, 1924. Serial No. 731,313. 8 Claims. (Cl. 126—39.)



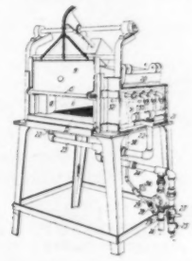
1. In apparatus of the class described, an oven, a combustion chamber thereheneath, a fresh air flue disposed therebetween; said fresh air flue being in communication with the atmosphere through a vertically arranged flue adapted to carry the incoming air into contact with heated rear walls of said combustion chamber and said oven, said oven being closed against admission of air or gases from said combustion chamber.

1,550,700. LAUNDRY DRIER. Charles J. Holub, Columbus, Ohio, assignor to The W. E. Lamneck Company, Columbus, Ohio, a Corporation of Ohio. Filed Jan. 2, 1925. Serial No. 23. 13 Claims. (Cl. 34—19.)



13. A drier for clothes and the like comprising a cabinet, a longitudinal radiator therein at the base thereof formed of a plurality of tubes connected at their opposite ends, a heater element within and at one end of the radiator, and a sectional base for the cabinet covering a portion of the radiator at the heater element containing end and beneath the radiator at the opposite end thereof, and providing an opening at an intermediate portion for admitting air about the radiator to be heated and into the cabinet, and escaping through openings in the top of the cabinet whereby heated air is circulated uniformly through the cabinet.

1,550,911. GAS FURNACE. Adolph W. Machlet, Elizabeth, N. J. Filed Aug. 6, 1923. Serial No. 656,106. 5 Claims. (Cl. 263—9.)

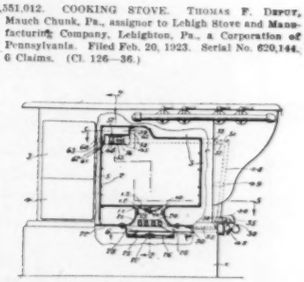


1. A furnace for heating iron, steel and other metal articles to high heat, for forging, welding, hardening and other purposes, comprising a flame chamber provided with burners, means for supplying a mixture of air and carbonaceous gas to the burners to secure the required degree of heat, whereby an excess of oxygen is admitted to the flame chamber of the furnace, and independent means connected to a fuel gas main for supplying separately to said furnace a small excess of carbon as raw gas or raw fuel directly to said flame chamber, neutralising said excess of oxygen and precluding the same from burning the metal articles or forming scale thereon.

1,549,458. GAS BURNER. Herman C. Daniels, Huntington, W. Va. Filed July 14, 1922. Serial No. 574,918. 1 Claim. (Cl. 158—106.)

A burner unit comprising an elongated body provided at a point between its ends with a globular enlargement adapted to serve as a mixing and expansion chamber and provided at one end with a cone-shaped air and gas inlet section which is connected with the said chamber by a passageway which is relatively restricted and cylindrical, the body being provided at its opposite end and communicating directly with the said chamber with a cylindrical nozzle having an outlet opening located in alignment with the axis of the body, the cylindrical nozzle being of greater diameter than the diameter of the passageway.

1,551,012. COOKING STOVE. Thomas F. Depue, Mauch Chunk, Pa., assignor to Lehigh Stove and Manufacturing Company, Lehighton, Pa., a Corporation of Pennsylvania. Filed Feb. 20, 1923. Serial No. 620,144. 6 Claims. (Cl. 126—36.)



1. In a cooking stove, the combination of a gas burner, a valve for controlling the flow of gas to said burner, said valve having a handle by means of which it may be operated, a draft damper for controlling the supply of air to the said burner, said damper being provided with a movable member, a movable actuating device for operating the said movable member, said actuating device being provided with a handle whereby its movement may be effected and the said actuating device being also provided with a projection for shielding the handle upon the said valve and for contacting therewith when the said damper is closed to effect closing of the said valve to thereby control the supply of gas to said burner.

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Gas Developments *in* Northwest Extension

(Continued from Page 17)

1000 cubic feet Some of the gas from the oldest wells in the district shows by test a content as high as 1.5 gal. per M, but the gas from the newest wells runs not over .75 gal. per M. The oline produced by the more efficient of the plants is of rather high gravity, ng rich in the very light fractions, which is usually characteristic of gas having a much higher content.

It is the opinion of most of the plant operators in the district that the gas will never be as rich as it is in the more central parts of the Long Beach field, but that it will probably be like the gas in the southeastern part of the field, which shows about 1.5 gal. per M. This is partly accounted for by the fact that the oil from the central part of the field is three to nine degrees lighter than the oil in either the Northwest Extension or the southeast end of the field, both of the latter averaging 22 to 23 degrees Beaumé. Another factor of undoubted portance is the ratio of gas flow to oil production. In the central part of e Long Beach field this ratio is on the average less than 1000 feet per barrel of oil. In the southeast end of the field the ratio ranges from 2000 to 2500 feet per barrel, while in the Northwest Ex- sion it has averaged so far over 3000 feet per barrel.

If this ratio drops as the field grows older, the gasoline content may increase to possibly 1.75 gal. per M., but it will probably never get much richer than that on account of the gravity of the oil. In any event, the possibilities of the field as far as can be seen at the present time would not seem to warrant the installation of any additional gasoline plant capacity.

Hotel Saves *with* Gas

(Continued from Page 18)

When a plant can utilize a clean and flexible fuel, with a minimum of labor, and with constant supply and uniformity in heat content, there appears to be but one choice—natural gas.

The accompanying graph represents cost of steam with oil (solid line) for four months of 1924 and gas (broken line) for same months of 1925. Prices of oil and gas compare equally and cost per 1000 pounds of steam is based on the steam generated and recorded by steam flow-meter. Unfortunately for comparison, September, 1924, was the first month the steam flow-meter was in operation. The average cost per 1000 pounds of steam for these four months with oil is $0.2773, while the average with gas is $0.2262, effecting a saving of some 18 per cent.

Good Natural Gasoline

(Continued from Page 28)

and larger differentials to re-sellers, better and better gasoline, palatial service stations and an absolutely ridiculous amount of expensive service to the motorists.

The portion of this selling program which affects the natural gasoline manufacturers is the refiners' necessity of selling a very high grade motor gasoline. Several years ago, the California refiners used to weep on one another's shoulders because of the strictness of the U. S. motor gasoline specifications (then the so-called Navy specifications). It was common practice to manufacture two grades of gasoline, one for sale in those cities which had adopted the Navy specifications, or else their own specifications very similar to the former, and another gasoline for sale elsewhere. This was the so-called "country" gasoline. This product had a considerably higher end point than the 437°F. end point required by the Navy specifications, and did not attempt to meet any of the intermediate points. On the present market this old time "country" gasoline could not be sold at all and U. S. Government specification gasoline is considered of such inferior quality that only gasoline "bootleggers" attempt to sell it at cut prices. As previously pointed out, all of this is simply the result of the keen competition between the California marketing companies.

Draught on Stocks Due

Now for several years, we of the California oil industry have said to one another that "Next year things ought to start looking up. Consumption is steadily catching up with production and when we start drawing on stocks, prices certainly ought to rise." Despite the fact that each year for the last three years has seen this era of rising prices always a jump or two ahead and we so far have not been able to catch up with it, it is nevertheless absolutely certain that this expected turn in the market will come sooner or later. The writer, by necessity like every other oil man, being a hopeless optimist, feels that the expected draught on stocks will come very soon, probably within the current year.

When that turn comes, the various large marketing companies who have been storing crude and tops for several years at enormous expense will have to retail gasoline at a much higher price than that now obtaining in order to recover the cost of storage and make a reasonable profit on the oil stored. We will then see a definite change in the quality of the gasoline offered the motoring public. There will no longer be any

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object in making a fancy motor gasoline by purchasing high priced natural gasoline for blending when the stimulus of cut-throat competition is removed from the refiners. We will then be in an era in which more gasoline is required by the public than is available by crude distillation or natural gasoline manufacture and it will therefore be possible to sell gasoline which is much inferior to the product at present being marketed on the Pacific Coast. It is doubtful whether the quality of gasoline which will be sold when this expected turn in the market comes will deteriorate to the point reached several years ago when the 140°F. initial boiling point was considered entirely satisfactory.

If it were not for cracking, there is no question but that we would go back to high initial motor gasoline. However, the large scale introduction of efficient cracking processes will in all probability check this tendency. The cracking plants will be able to bridge any gap between the demand for gasoline and the supply of the straight run and blended product. Therefore, it is safe to assume that competition will continue between the marketing companies, each of them trying to sell as much as possible in any given territory. However, this competition should be much more reasonable than the competition now prevailing, if for no other reason than simply because the competition will then be to sell a product which has to be especially manufactured for the demand, whereas at the present time it is necessary for the marketing companies to sell as rapidly as possible a huge stock of surplus material which cannot be held in storage except at a high cost.

Market for "Natural" Endangered

Despite the fact that it appears logical to assume that the quality of gasoline sold on the Pacific Coast during the next seller's market will not be as poor as that sold during the last such market, there is considerable danger in the situation for the natural gasoline manufacturer. Any lessening of the necessity for the production of a fancy quick starting gasoline by the refiners will immediately be reflected in a lessened demand for natural gasoline. The relative lessening of this demand will be directly proportional to the extent to which the refiners and marketers return to the standards of motor gasoline which were prevalent here in 1921.

(To be concluded in the March issue.)

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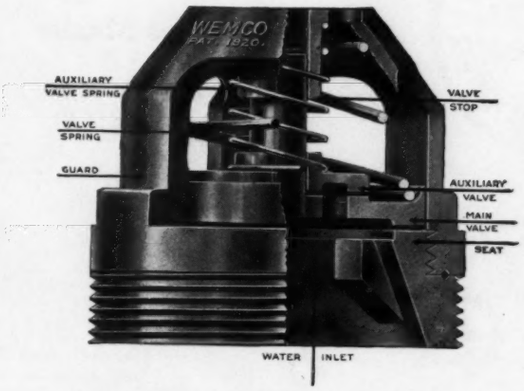

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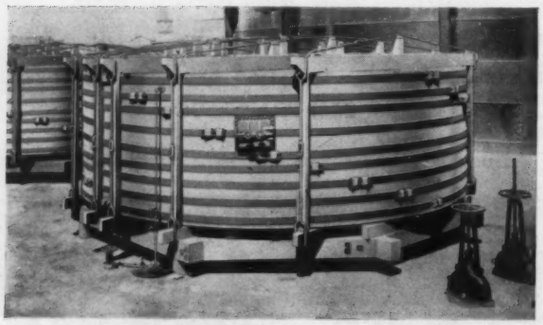

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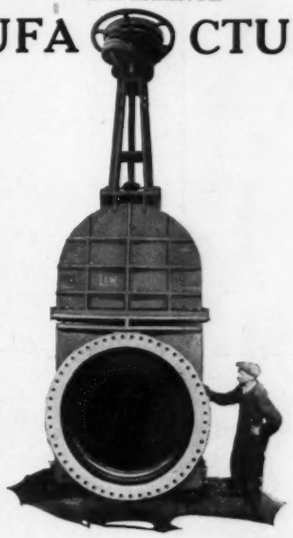

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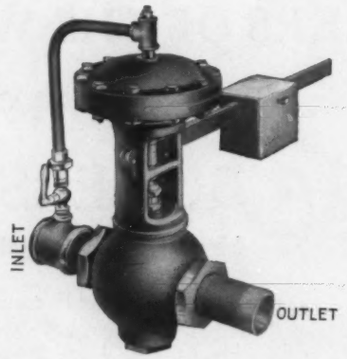

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Pacific Meter Works 11
Pacific Tank and Pipe Co. 46
Paraffine Companies, Inc. 12
Pittsburgh Meter Co. 43
Potter Radiator Corporation 37

Reliance Manufacturing Co. 45
Reynolds Gas Regulator Co. 47

Safety Gas Main Stopper Co. 46
Smith, Booth, Usher Co. 10
Southern Counties Gas Co. 8
Sprague Meter Company 44
Stauffer Chemical Co. 46
Steere Engineering Co. 9
Stockton Fire Brick Co. 41

United States Cast Iron Pipe and Foundry Co. 6

Western Gas 41
Westcott & Greis, Inc. 1
Western Pipe & Steel Co. 40
Western Sheet Metal Works 40

The Field for the

Humphrey Radiantfire

in

Apartment Buildings

APARTMENT house owners want to install heating systems which are thoroughly dependable; inexpensive to put in; maintained at low cost, and which not only add attractiveness to their buildings, but help to secure tenants for them.

Tenants of apartment buildings are people who seek the modernizations and conveniences which apartments today are equipped to give them. Especially pleasing to tenants is a heating system which affords them the utmost convenience and comfort, with Humphrey Radiantfire's known dependability.

The apartment building market is a logical field for Humphrey Radiantfire sales. It it any wonder, therefore, that throughout the Pacific Coast, apartments are more and more being Humphrey Radiantfire-equipped?

Manufactured by
General Gas Light
Company,
Kalamazoo, Mich.

The HUMPHREY
Radiantfire
TRADE MARK REG. U.S. PAT. OFF.

Pacific Coast Manager
C. B. Babcock
135 Bluxome Street
San Francisco

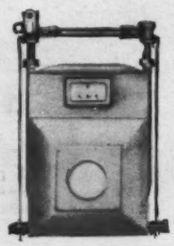
PROTECTION

HISTORICALLY, the blockhouse is an American institution and, in its period, was the most effective military defense against the enemies of the colonies and the young republic. Stirring battles were fought about these strongholds of rude logs, the stories of which have furnished thrilling reading for our boyhood years.

The protection needed today is against industrial enemies, against leaks and losses that threaten the resources of a business. Your gas lines, for example, are subject to the attacks of washer shrinkage, stresses, strains and sags.

The Lattimer-Stevens meter connection, with its rigid shelf, serves to hold each meter in firm alignment and guards your lines as effectively as did any military stronghold guard our forefathers.

No. 2 overlapping bar type Lattimer-Stevens meter connection with meter shelf.



No. 45-A tie-in bar type with L-S meter connection with meter shelf.

Lattimer-Stevens connections are available for every type of meter and alignment. Let us send sample, with catalog and prices.

THE LATTIMER STEVENS COMPANY, 72 Yale Ave., Columbus, Ohio.

LattimerStevens

METER CONNECTIONS~SHELVES
STOP COCKS ~ ~ ~ AND SEALS

New England Representative
THE EASTERN SERVICE CO.
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